# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

VOL. XIV. No. 348 FEBRUARY 13, 1926 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.5.0.

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

*The prepaid subscription to* THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

*Editorial and General Offices*—8, *Bouverie St., London, E.C.4.*

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

## Another Chemical Exhibition

THE British Industries Fair, which opens in London on Monday next for a fortnight, will again include a chemical section, but rather smaller in size than the previous exhibit. The chemical plant manufacturers, the bigger dyestuff firms, and the heavy chemical manufacturers are not represented this year, probably for reasons of economy after the rather heavy expenditure on Wembley during the past two seasons. The chemical exhibition at the Fair will, however, be well worth a visit, and will include, especially in pharmaceutical and fine chemicals, some examples of the progress this country has made in recent years. While the exhibition is mainly of interest to the actual buyer, it serves also as a valuable public advertisement and demonstration, and the latter purpose should be considerably helped by the decision, for the first time, to admit the public after 5 p.m. Some particulars of the scope of the chemical section are given in this issue and further reports will appear next week. The Fair is being organised by the Department of Overseas Trade, and in regard to the chemical section, as on previous occasions, the Department will have the advantage of the co-operation of the Association of British Chemical Manufacturers.

## The Cost of the Patent Office

IN these days, when economy of administration is everywhere eulogised, the statement by Sir P. Cunliffe-Lister in the House of Commons the other day that the entire cost of the Patent Office is more than covered by the receipts, and that therefore there is no net cost to the Exchequer, should be welcome news. Between 1914 and 1924 the total cost has gone up from £236,767 to £395,952, while the staff in the same period has only increased from 673 to 697. This should be equally welcome as showing that the modest emoluments of those courteous and learned gentlemen who, in 99 cases out of 100, are able truthfully to assure the optimistic inventor that there is nothing at all either novel, useful or possible in his idea, are trying to keep pace with the advancing cost of living. But there are people who even complain that the Patent Office pays its way. They say it exists for quite another purpose—to encourage invention and especially to prevent inventions from being lost owing to the poverty of their authors. We strongly suspect that very few inventions of any value, however poor their authors, are allowed to run to waste in this way; on the contrary that the almost excessive facilities offered tend to the patenting of many quite worthless devices. In any event, we should hardly be prepared to see the present fairly reasonable fees abolished in the case of people who can well afford to pay them, and that would be a necessary result of opening a free path to every poor inventor. Poverty among the inventing class would at once spread like a contagion.

While on this subject it may be mentioned that some interesting opinions have reached us regarding Dr. Levinstein's recent suggestion that the chemical research laboratory at Teddington should serve as a first intelligence department in the matter of new chemical and dyestuffs patents. The Patent Office itself, it is pointed out, issues a list which indicates shortly what the nature of each patent is and enables anyone interested to pursue the inquiry by obtaining the full patent specification. This, of course, takes time, but it would also take time on the part of any centralised staff. The chief objection expressed to the centralised plan is that so specialised has chemical industry become and so intensive its research work that the same patent might appeal to each of a dozen specialists in quite a different way. In some cases a patent of intense value toone or two might be of negligible interest to the rest. For any central staff therefore to determine even the elementary question whether a patent promises to be of value or not would be extremely difficult and risky, for what might appear to be of no particular value to 99 chemists might be of the most vital value to the hundredth. Dr. Levinstein's idea of making the newest chemical inventions as widely and as easily accessible to all is

excellent, and we should be glad to have opinions on the possibility of giving effect to it, either through Teddington or in any other way.

## Naphthalene as a Motor Fuel

A READER discussing the ever-recurring problem of home-produced supplies of suitable fuels for internal combustion engines remarked recently on the work that has already been carried out with naphthalene. He suggested that in a quiet way a good deal of progress has lately been made in Germany with this hydrocarbon, and that eventually its use for this purpose may have to be regarded more seriously than has hitherto been the case in this country. It was, we believe, in 1914 that naphthalene first suggested itself as a motor fuel, but the experiments that were then being conducted were impeded by the outbreak of the war. At that time it was estimated that the cost of naphthalene fuel would approximate to 0·4d. per b.h.p. hour, while so far as supplies were concerned it was pointed out that this country produced about 130,000 tons per annum.

As a means for regulating the naphthalene market its development as a fuel should be well worth further consideration, and it is interesting to recall the experiments carried out by Mr. L. S. Palmer some five or six years ago. Mr. Palmer eventually found that the best results were obtained by dissolving naphthalene (to the extent of 15 per cent. by weight) in ordinary commercial benzol. The mixture thus yielded is about 3d. per gallon cheaper than benzol, and it will give about 4 per cent. greater mileage. With stronger solutions there was a persistent falling off in efficiency, with a tendency to deposit naphthalene, and curiously enough when petrol was used as the solvent in lieu of benzol it was not found possible to utilise a concentration greater than 5 per cent. Although, however, the most practicable means of utilisation would appear to be that of dissolving the naphthalene in a suitable spirit, it must not be overlooked that the earliest experiments utilised the substance solely by itself. Owing to its comparatively high boiling point naphthalene is, of course, a solid at ordinary temperatures, and while this is, perhaps, a disadvantage, a change to the vaporous form is easily effected by employing a reservoir jacketed by the exhaust gases, the engine being started and warmed up on petrol. Our informant, who has himself had some little experience with the utilisation of naphthalene in this way, certainly speaks hopefully of its possibilities, and would be glad to get in touch with others who may have experimented on similar lines.

## The Dyestuffs Situation

IN our Monthly Dyestuffs Supplement, published in this issue, the general position of the British dyestuffs industry is further reviewed. In contrast with Mr. Sutcliffe Smith's treatment of the subject from the user's standpoint, Major Holliday now discusses it from the maker's side, and a new point of view—that of the ultimate wearer—is introduced by yet another correspondent. This comparative method of treatment seems to us to show with increasing clearness that, though criticism may reveal numbers of weak points in the industry, the constructive and development work accomplished within the last ten years remains a remarkable triumph of dyestuffs chemistry and technology. Dr. Rée, in his presidential address to the Manchester Chamber of Commerce this week, touched on one point that may tend to check impatience at the present rate of progress. When asked once for his estimate of the period that would be required to establish a British dyestuffs industry, he mentioned twenty years counting from 1916. Nor, remembering the time the establishment of the German industry occupied, does the estimate seem excessive. If up to 1936 it is possible to maintain the rate of progress made up to 1926, what remains of the national problem to be solved will not be of formidable proportions. That, it seems to us, is the moral of the situation—just to keep the work always going forward.

The reference to Dr. Rée recalls the interesting fact that he has just accepted an invitation to join the board of directors of the British Dyestuffs Corporation. It is an appointment that will be universally endorsed. Not only does it add to the scientific qualifications of the board, on the importance of which emphasis has often and properly been laid, but it brings an equal contribution to the commercial qualifications. As a director of the Manchester Chamber of Commerce for many years and president for the past two, Dr. Rée has necessarily been brought into intimate touch with the great textile industry on which the maker and the user of dyes so much depend. Formerly a chemical manufacturer, he took an active part in founding the Association of British Chemical Manufacturers, and for two years served as President of the Society of Dyers and Colourists. The B.D.C. directorate will be the stronger for the acquisition of this valuable experience and of the personal qualities, both as chemist and business man, that accompany it.

## A Question of Nomenclature

IN the matter of nomenclature of chemical substances, it must be acknowledged that there is still plenty of room for improvement. From the standpoint of the purely scientific designation of the innumerable compounds that the chemist meets with there is, perhaps, no great cause for complaint, but in commercial circles one finds that a good deal of looseness prevails in the application of some particular term, so that it may be difficult for a purchaser to know precisely what he is buying or whether the material on offer is actually what he wants. It will, we think, not be disputed that in many ways commercial chemical nomenclature could do with a little purifying, and we are glad to note that Dr. Percy Spielmann—who has always championed the cause of accuracy in this respect—has pointed to the dangers which may result from the deliberations which the British Engineering Standards Association has commenced on the standardising of the nomenclature of tar products for road purposes.

It is quite rightly urged that the definitions that are finally adopted must take serious notice of the derivations of the words and of their current meaning to the interested public, and they must be given an undoubted and unequivocal significance with which no tampering is possible. Every opportunity is, in fact, afforded for confusion between the products derived from natural oil and those derived from the distillation of coal and

similar products, so that, in the interests not only of technologists but of buyers and sellers, it is in the highest degree desirable that there should be the strictest differentiation between materials from the two sources. As Dr. Spielmann rightly says, whatever may be the immediate advantage of confusion between the two, the ultimate effect will be the uncertainty of, and distrust by, the buying public.

The points mainly at issue are in connection with the familiar terms, pitch, bitumen, and asphalt. The word bitumen has long been used to designate the black substance resulting from or associated with natural or artificial changes in petroleum, and if an attempt is made to include tar or pitch under the same heading the bewilderment would be complete. Dr. Spielmann strongly urges that the word "bitumen" should be left to cover the petroleum product solely and that it should not be encroached upon by the coal and shale interests, who have no right whatever to class their tar as "bitumen" and their light oils as "petroleum spirit," as a new Bill which has already passed its third reading might permit them to do. Finally, it will be agreed that the only sure manner in which nomenclature can be standardised is by working upon lines of scientific accuracy, tempered judiciously, but as little as possible, by compromise with long-standing custom.

## Burning of "Pyrites Fines"

Is there any relation between the size of pyrites and their efficient combustion in mechanical burners? This question has hardly received the attention its importance merits. There are pyrites and pyrites, and some qualities are more amenable to treatment in mechanical burners than others. Foldal pyrites fines about $\frac{3}{8}$ in. in size have been burnt in a large mechanical burner with uninterrupted satisfaction for many months, but there is no record of the screening characteristics of the material. On the other hand, Esperanza fines of approximately the same size have proved not nearly so satisfactory when treated in the same mechanical burner. They had a tendency to decrepitate, apart from which they were much more prolific in the production of clinker than the Foldal pyrites.

The size of pyrites fines must be of fundamental importance as affecting the question of efficient combustion, quite apart from the other peculiarities of the pyrites. As to the primary considerations that govern the size of pyrites fines, one must agree that the greater the surface of the pieces per unit weight the better and more quickly will combustion proceed. Clearly, the smaller the size of the pyrites, the better from the point of view of surface for oxidising action. But there is a limit to the size, beyond which it would be unwise to go. Manifestly, the smaller the particles the greater the possibility of dust. There must, therefore, be a compromise between the maximum surface of a given particle and its weight or density. If the particles are too light, the possibility of entrainment with the burner gases is increased. The best compromise is probably to be found in pyrites having the following characteristics:—95 per cent. should pass an 8 mm. screen and 90 per cent. should remain on a 4 by 4 mm screen. It is believed that the tolerances contemplated by the above specification are reasonable from a commercial and mines point of view.

Some years ago a specification to which at least one pyrites-supplying company conformed provided that 10 per cent. only of the pyrites fines was to be refused on a 12·5 mm. screen. This 10 per cent. must easily pass through a screen of 18 mm. Of the total bulk not more than 20 per cent. should pass a screen of 3 mm. It is known that pyrites fines, the bulk of which will remain on a 15 mm. screen, are unsatisfactory for combustion in mechanical burners. A core of unburnt pyrites can invariably be found in the larger lumps. Combustion apparently takes place on the outside surface of the larger pieces, but there is a small core which is practically unattacked by oxygen. As this question is of fundamental importance, it would be interesting to have an expression of opinion on the subject from acid manufacturers who have been accustomed to burn pyrites smalls in mechanical burners.

## Books Received

HEAT TRANSFER AND EVAPORATION. By W. L. Badger. New York: The Chemical Catalog Co., Inc. Pp. 306. $5.00.

AN INTRODUCTION TO INDUSTRIAL CHEMISTRY. By S. I. Levy. With an introduction by Sir William J. Pope. London: G. Bell and Sons, Ltd. Pp. 288. 15s.

AN INTRODUCTION TO THE STUDY OF ORGANIC CHEMISTRY. By Dr. John Wade. Revised by Henry Stephen, D.Sc. London: George Allen and Unwin, Ltd. Pp. 646. 8s. 6d.

NOTES ON COSTING FOR THE BAKERY TRADE. By James Grant. London: Edward Arnold and Co. Pp. 32. 3s. 6d.

JOURNAL OF THE ROYAL TECHNICAL COLLEGE, GLASGOW. No. 2. December, 1925. Printed and Published for the College by Robert Anderson, 142, West Nile Street, Glasgow, C.1. Pp. 160. 10s. 6d.

THE SYNTHESIS OF BENZENE DERIVATIVES. By S. C. Bate. London: Ernest Benn, Ltd. Pp. 229. 21s.

THE SILK AND RAYON (ARTIFICIAL SILK) TRADES DIRECTORY AND BUYERS' GUIDE, 1926. By Arnold H. Hard. London and Manchester: John Heywood, Ltd. Pp. 268. 21s.

VOLUMETRIC IODATE METHODS. By Dr. George S. Jamieson. New York: The Chemical Catalog Co. Inc. Pp. 96. $2.00.

## The Calendar

| Feb. | | |
|---|---|---|
| 15 | Worshipful Company of Dyers: "Vat Dyes and Some Recent Developments." R. Fraser Thomson. | Dyers' Hall, Dowgate Hill, London, E.C.4. |
| 15 to 26 | British Industries Fair: | White City, London. |
| 16 | Hull Chemical and Engineering Society: "Tars from Low Temperature Carbonisation." N. Simkin. 7.45 p.m. | Grey Street, Park Street, Hull. |
| 17 | Leicester Literary and Philosophical Society (Chemistry Section): "Chemistry in the Service of Industry." Dr. A. S. Wood. 8 p.m. | The Museum, New Walk, Leicester. |
| 17 | Society of Glass Technology: | Sheffield. |
| 18 | Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): Open Meeting. 7.30 p.m. | The North British Station Hotel, Edinburgh. |
| 18 | Chemical Society: Ordinary Meeting. 8 p.m. | Burlington House, Piccadilly, London. |
| 18 | Royal Society. 4.30 p.m. | London. |
| 19 | West Cumberland Society of Chemists and Engineers: Discussion—Technical Education. Introduced by A. B. Coles. 7 p.m. | Workington. |
| 19 | Society of Dyers and Colourists (Manchester Section): "Reminiscences of the Dyeing Trade, 1869-1925." W. H. Pennington. | Manchester. |
| 22 | Institute of Chemistry (Manchester Section): Professor H. E. Armstrong. | Manchester. |
| 23 | Society of Chemical Industry (Birmingham Section): "The Heat Reactions occurring during the Vulcanisation of Rubber." A. A. Perks. | The University Buildings, Edmund Street, Birmingham. |

# The British Industries Fair of 1926

## Preliminary Notes on Chemical Exhibits

*We give below notes on the history of the Fair and are glad to publish a statement by Mr. W. J. U. Woolcock, who has organised the Chemical Section. The Birmingham and London Sections will be held simultaneously and the Chemical Section is housed at the White City, Shepherd's Bush.*

THE British Industries Fair of 1926 opens at the White City, Shepherd's Bush, London, on Monday next, February 15, and will continue until Friday, February 26. As will be seen from the plan published in this issue, the arrangements respecting the chemical section are the same as on previous occasions. The Shepherd's Bush entrance leads directly into the chemical hall, along the sides and in the centre of which the various exhibits will be on view. In making the arrangements, the Department of Overseas Trade has again had the great advantage of the experience and active assistance of Mr. W. J. U. Woolcock, general manager of the Association of British Chemical Manufacturers. Mr. Woolcock was responsible for the chemical sections in the London Fairs of 1922 and 1923, and for the fine chemical exhibition at the British Empire Exhibition at Wembley in 1924 and 1925. The Wembley Exhibition accounts for a gap in the sequence of the Industry Fairs, and some doubt might be felt as to the effect of Wembley, with its heavy expenditure, on the chemical side of the present year's exhibition. The fact, however, that Mr. Woolcock is undertaking the organisation again is an indication of his own views and as good a guarantee as could be desired that the chemical interest in the Fair justifies the continued effort.

The following notes may serve to indicate the interest which is being taken in this year's Fair and the possibilities of it not only as a stimulant to trade but as valuable propaganda.

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It is not inopportune to recall the short history of the Fair in order that this year's efforts may be viewed in true perspective. The Fair has been in existence since 1915. It was originally a war-time measure to assist British firms to produce goods formerly imported from Germany and other foreign countries. It was intended to be one single effort, but the exhibitors persuaded the President of the Board of Trade to continue the Fair. During the next few years the Fair had a somewhat adventurous existence. It was held at the Victoria and Albert Museum, at the Imperial Institute, at the London Docks, and at the Crystal Palace. In 1920 the Birmingham Section was started. Then, in 1924, came the British Empire Exhibition and the Fair was held to coincide with it. In 1925, with Wembley still continuing, it was decided not to hold the London Section at all.

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The great response made by every branch of industry to the call of Wembley is now a matter of history. If only from a patriotic motive this response was expected, although many firms had every reason to appreciate the results in actual business done. This enterprise, however, was bound to have some effect upon future exhibitions, particularly when they followed close upon its heels, as does this year's B.I. Fair. With the best will in the world there must be a limit to advertising expenditure in any given period, and the expenses of Wembley, justified as they were, no doubt, have induced some of the larger chemical firms, who might normally have been prepared to participate, to refrain from exhibiting at next week's function. Against these drawbacks may be set the increased activities of the Government. This year it voted a sum of £20,000 for a world-wide publicity scheme. In addition to a well-organised advertising campaign, in which the importance of trade paper announcements was fully recognised, the Board of Trade authorities have greatly extended their methods and introduced new features. At the request of many exhibitors the public will be admitted to the Fair each evening from 5 to 8 p.m. This is an innovation which will be watched with interest, but which has comparatively small bearing on the majority of chemical exhibitors—at least from the selling aspect. There will also be Colonial and Dominion sections at the London Section of the Fair.

Bearing all these circumstances in mind the prospects of the Chemical Section may be viewed with satisfaction. It is reassuring to find Mr. Woolcock, the organiser, after his exceptional experience at Wembley, so thoroughly convinced of the value of the forthcoming exhibition; as he obviously is from a statement he has kindly made to THE CHEMICAL AGE. "At the present moment," Mr. Woolcock said, "when the slogan, 'Buy British Goods' meets the eye at every turn, it behoves every thinking person to pay a visit to the Chemical Section of the British Industries Fair. Here the exhibits prove, beyond all doubt, the advisability of putting into practice this very sound advice. This section in housed in the hall immediately facing the Uxbridge Road entrance to the Fair, and has been organised with the assistance of the Association of British Chemical Manufacturers, a number of whose members are making a striking display of fine, pharmaceutical, and photographic chemicals, tar and ammonia products, dyes, intermediates, and certain heavy chemical products. The fine chemicals exhibited are of a very comprehensive character and indicate clearly the extraordinary progress which has been made in this particular branch of chemical industry during and since the war."

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Mr. Woolcock stressed the point that over a thousand fine chemicals which were not previously made in this country are now being produced, and they include research, analytical, and photographic chemicals in addition to a number of medicinal chemicals of a particularly interesting type. The exhibit of crystals of alum, of bichromates, and of cyanides shown together in one case, he remarked, "will remind buyers that this country is still pre-eminent in their manufacture. As time goes on and knowledge increases, science is no longer the exclusive domain of the scientist. There are few educated people who are not interested in some degree or other in one of its many branches, and the realisation of the important part it plays in the lives of everyone has now come to all."

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Apart from the actual buying and selling there is in such exhibitions the important national trade aspect. On this point Mr. Woolcock was emphatic. "To the buyer of chemicals there is little that need be said, because he will form his own judgment. The Fair this year makes a wider appeal, because the public are being allowed to attend. No visitor can be uninterested in what is shown in the Chemical Section. The manner in which the goods are displayed will first attract him, but their importance in the national life will retain the visitor's attention. The products of chemical industry enter into every other industry. The iron and steel industry depends on scientific control: in its laboratories will be found the analytical chemicals. The cotton and textile industries are dependent on heavy chemicals, and for the beautiful colours they require the dyestuffs of Great Britain. Photography is to-day a common place art; the chemicals, whether for the schoolboy, the newspaper photographer, or the radiographer in the hospital, will be found in the Chemical Section. And what shall be said of the still wider range of medicinal and surgical chemicals that make for the health, comfort, and well-being of the human race?"

"The science of chemistry," Mr. Woolcock continued, "has become so complicated, and its uses in industry are so various, that the ordinary man hesitates to probe too deeply into the matter, yet the fundamental facts are easy to understand. First comes the period when all the then known chemicals were obtained from nature, followed by the patient investigations to discover of what they were made: then the attempt to reconstruct them from the knowledge so obtained. Finally, the production of really new substances which have never been found in nature."

Dealing with the exhibits more in detail, Mr. Woolcock remarked that among the host of aniline dyes shown by Williams (Hounslow), Ltd., there is a complete range of specially prepared "Harmless Colours" for all classes of confectionery, which are guaranteed to conform to all existing regulations of the Ministry of Health. One of the most interesting exhibits of the British Drug Houses, Ltd., is "Borocaine," the new local anæsthetic, which is the result of research work carried out at Cambridge University. It is exhibited in the three forms in which it is issued, viz., powder, 2 per cent. sterile solution, and tablets of two strengths. Hopkin and Williams, Ltd., are showing a set of guaranteed chemical reagents for scientific and research purposes which are prepared to conform to the standards and tests described in "Analytical Reagents, Standards and Tests," compiled by Edmund White, B.Sc., F.I.C.

A comprehensive display of fine chemicals for industry, research and medicine, including a range of modern remedies for various disorders and tropical diseases, will be shown by May and Baker, Ltd. All the drugs made by this firm answer the requirements of the Pharmacopœias in which they are included. Boake, Roberts and Co., Ltd., have a fine display of fine and technical chemicals. Particular mention may be made of Ionone-artificial violet, which is used in the manufacture of soap and perfumery. W. J. Bush and Co.'s exhibit may be divided into two main groups consisting of fine chemicals and essential oils and perfumes, prominent among which is Vanillin, of which this company is the oldest British maker. Thomas Morson and Son, Ltd., are making a special display of fine chemicals used in the manufacture of the highest class of toilet preparations, medicine and pharmacy.

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Buyers of bismuth carbonate will, it was stated, find an excellent exhibit on the stand of Thomas Tyrer and Co., Ltd., who manufacture pharmaceutically pure bismuth carbonate in densities varying from 50 lb. per cubic foot to as low as 9 lb. per cubic foot. The Graesser-Monsanto Chemical Works, Ltd., besides showing leading lines in phenol, cresol, and their derivatives used in the pharmaceutical, disinfectant, dye, and technical industries, have on view many interesting specialities. In addition, Albright and Wilson, Ltd., Boots Pure Drug Co., Ltd., The Gas Light and Coke Co., Howard and Sons, Ltd., Johnson and Sons (Manufacturing Chemists), Ltd., The South Metroplitan Gas Co., and Whiffen and Sons, Ltd., are all making attractive displays of their products.

"It will be seen," Mr. Woolcock remarked in conclusion, "that buyers of chemicals should have no difficulty whatever in obtaining everything they require from British manufacturers."

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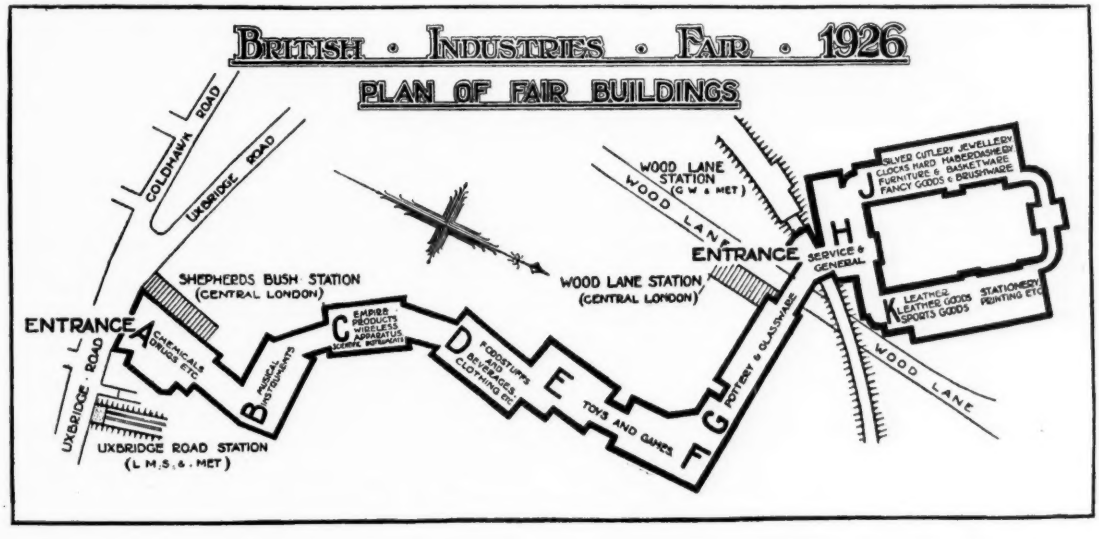
Everything possible has been done to ensure business efficiency at this year's Fair. The visitor will find special postal, telegraphic, and telephonic facilities, and special arrangements have been made whereby foreign buyers and visitors may have correspondence addressed to them. A typewriting bureau will be available in the Stationery Section (Stand K86) and the D.O.T. have installed a special office where all commercial information is available. In addition, officers of the Department will be found in each section of the Fair who will be prepared to advise on the conditions in overseas markets, agents, and other export matters. Interpreters will be available free of charge. A comprehensive catalogue has been prepared and is presented free to all trade buyers in exchange for their invitation cards. As the classification of exhibits between London and Birmingham has been strictly adhered to, the visitor may rest assured that the exhibits in either section constitute the whole of such exhibits in the Fair.




## How to Reach the White City

THE Uxbridge Road entrance is the more convenient for the Chemical Section, as will be seen from the above plan.

The appended list outlines the handiest routes to the Fair from the various Metropolitan main line stations; in each case Shepherd's Bush can be substituted for Wood Lane.

EUSTON.—Wood Lane from Euston, change at Tottenham Ct. Rd.

KING'S CROSS.—Wood Lane direct (Metropolitan Railway).

ST. PANCRAS.—See King's Cross.

MARYLEBONE.—Wood Lane from Marylebone (Electric Railway), changing at Oxford Circus or Wood Lane from Edgware Road.

LIVERPOOL STREET.—Wood Lane direct from Liverpool Street.

PADDINGTON.—Wood Lane direct from Praed Street or Bishop's Road (Metropolitan Railway).

CHARING CROSS.—Wood Lane from Charing Cross (Electric Railway), changing at Oxford Circus.

WATERLOO.—Wood Lane from Waterloo (Electric Railway), changing at Oxford Circus.

VICTORIA.—Wood Lane from Victoria (Electric Railway), changing at Notting Hill Gate.

FENCHURCH STREET.—Wood Lane direct from Aldgate.

LONDON BRIDGE.—Wood Lane from London Bridge Station (Electric Railway), changing at Bank.

The following bus services pass the Uxbridge Road entrance (Chemicals) to the White City:—From Whitehall via Piccadilly Circus, Oxford Circus, Marble Arch, Nos. 32, 88, 88A, 112, 112A, 112B; from Holborn or Ealing, Nos. 17, 17A, 17C; from Lewisham via Victoria and South Kensington, Nos. 49A and 49C; Nos. 11, 11A, 11E bus Strand, Victoria, Shepherd's Bush, may be of service.

Various tramway services from Twickenham, Hounslow, Kew, Ealing, and Acton run to Shepherd's Bush. L.C.C. tram service from Harrow Road or Hammersmith passes the Wood Lane entrance.

# Chemistry and National Industry

## Increased Importance of the Chemist

Dr. Alfred Rêe, in his concluding address after two years as president of the Manchester Chamber of Commerce, on Monday, said that the grave position in the cotton industry of Lancashire needed searching investigation. Britain, however, was in the forefront of artificial silk manufacture, and if any considerable proportion of the projects eventuated, we should lead the world. Existing concerns of proved success were finding it possible to expand their output capacity.

"With regard to the fine chemical and dyestuff industries," said Dr. Rée, "the former is making most satisfactory progress, especially bearing in mind the tremendous start that the German industry for these products has had, and the difficulties arising from depreciated exchange in competing countries as well as the low labour charges there. One must also consider the factor that foreign competitors have been able to

Dr. Alfred Rêe, whose Appointment to the Board of the B.D.C. is noticed on Page 18.

write down their capital to a very low figure indeed during the years of high profits, nor must we forget the effect at home of general trade depression, high taxation, and uncertainty as to the political situation. The number of fine chemicals now produced in this country is enormously in excess of the number produced in 1914, and the purity has improved considerably.

### Better Dyestuff Position

The coal-tar by-product industry, which, in the latter part of 1924 and early in 1925 was suffering from greatly depreciated values, had largely recovered.

"With regard to dyestuffs, the position is somewhat better in certain respects than it was a year or two ago, but the industry is still faced with many difficulties. It may not be out of place for me to mention that I was consulted about eight years ago as to the time I estimated it would take to establish our dyestuff industry on really satisfactory lines. I made a statement in reply, which I have reason to believe was intended for the Prime Minister, that I thought under favourable circumstances it would mean about 20 years counting from 1916. This estimate was regarded in more than one quarter as an absurdly gloomy one, but in the light of the experience we have had during the last ten years, I am not sure whether the view I then expressed did not err on the side of cheerful optimism. I am making this statement mainly with the object of emphasising the need of the greatest possible patience in all matters connected with this particular branch of industry. I am profoundly convinced that it is absolutely essential for our national well-being that the industry should be established in England on sound lines, no matter how long it takes for that object to be accomplished."

It was perhaps sometimes overlooked in that great city, said Dr. Rée, that in the future affairs of the nation chemistry would play a part of an importance which very few realised to-day. He would go so far as to say that our future industrial and commercial existence depended to a predominant extent on the chemist and his work. It had been well said that no section of specialised knowledge held so many possibilities as chemistry. The greatest encouragement should be given to those who had the ingenuity to turn chemical knowledge to practical use in the service of humanity. There was need, too, for further improvement in the law relating to patents.

The coal industry could never hope to get over its troubles without the intensive application of chemistry, whereby means would be found in due course to utilise coal far more advantageously than was the case at present. The possibilities of making agriculture in this country a thoroughly paying proposition were bound up to an extent that could hardly be exaggerated with the production on a large scale and at a sufficiently low price of nitrogen products from the air. These, as was well known, were required to increase the productivity of the soil. It was hardly necessary to point out what an important part the chemist played in the textile industries. He referred particularly to the bleaching, dyeing and printing and dye-making industries. Nor should we forget the iron and steel industries, the wonderful developments in which were very largely due to the chemist.

"I certainly believe," said Dr. Rée, "we shall pull through our difficulties. The rapidity with which we can clear away many of our difficulties depends very largely on ourselves. The power of public opinion is very great and a really clear, determined, well-informed public opinion can do much to influence a speedier and more satisfactory solution of our present difficulties. This public opinion can only be created by individual men and women thinking things out for themselves, and I do feel that it is the duty of all of us at the present time to use all our energies to that end."

# Chemists and a Professional Status

At a meeting of the British Association of Chemists, held at Manchester last week, Mr. L. Guy Radcliffe, M.Sc. (Tech), F.I.C., gave an address upon the importance of establishing a register of chemists and their recognition as practitioners of professional status. Dr. Herbert Levinstein presided. Mr. Radcliffe thought that he was fairly correct in saying that the B.A.C. came into being because there was no body willing to move energetically in the political and ethical interests of chemists in general, and he urged that the Association and the Institute of Chemistry, which was mainly an examining body, should co-operate in the fullest degree for the purpose of enhancing the prestige of the practice of chemistry.

Teachers of chemistry, he thought, should be invited to form a consultative committee to formulate a curriculum sufficiently adequate to allow of the student who successfully conformed to the requirements being registered as a professional chemist. Once this was done, the scheme could be actually administered by another committee, composed partly of teachers and partly of representatives of chemists drawn from the most important scientific societies and branches of the professions, with, most emphatically, a leaven of the younger generation. Possibly the Federal Council of Pure and Applied Chemistry might help. Parliamentary recognition, in some form or other, he said, would have to be sought very soon. The compulsory registration of all competent chemists would tend to create a common ideal, and a body of professional men would certainly know how to use their united strength in a reasonable and proper manner.

## Dinner in Honour of British Science

At a dinner of the Maccabæans in London on Saturday, February 6, in honour of British Science, Lord Rothschild, President of the Society, occupied the chair. Amongst those who accepted invitations to be present were: Sir Charles Sherrington, Sir William H. Bragg, Professor G. G. Henderson, Professor J. B. Cohen, Dr. P. E. Spielmann, Professor I. M. Heilbron, Professor W. P. Wynne, and Dr. R. Lessing. The Chairman, in proposing the toast "Science," said that we should find that wherever science was taken in its proper estimation humanity would recognise that knowledge was power.

Dr. Percy Spielmann proposed "The Guests" and Sir F. Kenyon and Sir W. Bragg responded.

# High Temperature Fluid Heat Transmission

## Applications in Industrial Processes

At a meeting of the Manchester Section of the Society of Chemical Industry, on Friday, February 5, Mr. L. Guy Radcliffe, M.Sc.Tech., F.I.C., presiding, Mr. J. Arthur Reavell, M.I.Mech.E., M.I.Chem.E., read a paper on "Fluid Heat Transmission for High Temperatures in Industrial Processes."

Mr. Reavell said that the subject was of very great technical as well as practical interest. The term "Heat Transmission" was used as meaning the transmission of heat from the point at which it was generated to that at which it was used, in contradistinction to the sense in which it was frequently employed, namely, the transfer of heat from one medium to another through a dividing wall or heating surface. For the latter sense he employed the term "Heat Transference." In a great many modern industrial and chemical processes both methods were of importance.

Dealing first with the common examples of heat transmission such as the application of saturated steam for heating purposes in industrial work generally, Mr. Reavell said that electricity, as a source of heat at high temperatures, was almost ideal from the point of view of ease of control and thermal efficiency, assuming a reasonably close supply of power, but it was too costly for ordinary industrial applications. The fact that one K.W.H. was equivalent to only 3,400 B.T.U., and might cost anything from ½d. to 2d., precluded its use for anything but the most special operations. Another method of heating was direct firing, either with gas, oil or solid fuel. The only advantage this method had was its simplicity, and its inherent disadvantages were: (*a*) Extremely low thermal efficiency; (*b*) absence of accurate temperature control; (*c*) uneven distribution of heat, resulting in local overheating and damage to the product; (*d*) grave danger of fire; and (*e*) rapid burning away and deterioration of the vessel. The problem was to devise a method for the transmission of heat at a high temperature economically and efficiently, and its solution was "Fluid Heat Transmission." Such a system would consist essentially of a circuit embodying the heat generator, the plant to be heated, and the interconnecting pipe lines for circulation of the fluid.

### Oil as a Suitable Fluid

The desiderata of a suitable fluid were the following: Its transmission medium must not involve high pressures, it must be capable of withstanding high temperatures, have a reasonably high specific heat and a low viscosity. Oil possessed the desirable attributes. Every liquid exerted on the surrounding space its own vapour pressure which varied with the temperature of the liquid in accordance with definite laws. With the majority of liquids at temperatures approaching 600° F. the vapour pressure became very high, but with certain oils at these temperatures the vapour pressure remained within reasonable limits and high working temperatures might be employed. The possibility of carbonising or cracking was a very serious matter in some cases, but he could affirm that there was available a special grade of oil which was satisfactory in this respect (meproline). Given a correctly designed heating system this oil would give satisfactory service night and day indefinitely. The specific heat of all ordinary oils at atmospheric temperature was in the neighbourhood of 0·5 and rose more or less steadily as the temperature increased.

Between 500° F. and 600° F. an average specific heat was 0·57. Thus, in cooling from 600° F. to 500° F. 1 lb. of oil would give up about 57 B.T.U., a little more than from the same weight of superheated steam, namely, 52 B.T.U. On the other hand, the same volumes of oil and superheated steam contained vastly different quantities of heat. For instance, 1 cubic foot of oil at 600° F. weighed about 45 lb., and, in cooling to 500° F. evolved 2,570 B.T.U., whereas 1 cubic foot of steam at 100 lb. per sq. in. evolved 10 B.T.U. Normally, it was preferable to allow only 50° F. temperature drop in the oil; hence the true comparative figures were 1,285 B.T.U. for oil and 10 B.T.U. for superheated steam per cubic foot; *e.g.*, oil would carry 128 times as much heat as an equal volume of superheated steam.

It would be argued, however, quite rightly, that a larger volume of steam than of oil could be conveyed through a pipe of given size. To make a comparison Mr. Reavell took a velocity of 100 ft. per second for steam and 4 ft. per second for oil, the latter being a safe average figure. On this basis, volume for volume, a given pipe would carry 25 times as much steam as oil; but since oil carried 128 times as much heat as the same volume of superheated steam the net result was greatly in favour of oil, in the ratio of 128 to 25, or, roughly, 5 to 1. Expressed in another way, a 4 in. pipe carrying oil would convey 1,610,000 B.T.U. per hour, while a 9 in. pipe was required to convey the same quantity of heat with superheated steam. Taking a high steam velocity, say, 150 ft. per second, the advantage still lay with oil, the corresponding ratio being roughly 3½ to 1.

Oil that was suitable in other respects as a medium for heat transmission might be somewhat viscous at atmospheric temperatures, but such difficulties could be overcome in the heating system; moreover, they were only of secondary importance, since the viscosity very rapidly fell off with a rise in temperature, and, at normal working temperatures, approached that of water. Oil, therefore, might be regarded as entirely satisfactory for heat transmission at high temperatures. That this was the case had been fairly well known to investigators of heating problems for some years; in fact, many attempts had been made, for the most part with indifferent success, to employ oil in a fluid heat transmission system. Failure had been largely due to want of a proper understanding of the numerous factors involved and a lack of attention to detail.

As an alternative to oil, water and molten lead had been suggested and actually used in fluid heat transmission systems, but compared to oil both suffered from serious disadvantages. For example, under atmospheric pressure, water boiled at 212° F., and, to work at temperatures comparable to those obtained with oil, the circulating system must be closed and subjected to high internal pressures. For a temperature of 600° F. (316° C.) a pressure of about 1,550 lb. per square inch was required. While heating coils to withstand this pressure could be constructed, the practical uses of such a system were very limited.

### Disadvantages of Using Water

One of the most serious drawbacks was that positive circulation of water was impossible since no known form of pump gland would withstand such high working pressures. The result was that thermal circulation must be relied upon with correspondingly low velocities of circulation. This meant a slow rate of heat transmission and relatively large heating surfaces for a given heating capacity. There was also the disadvantage that the furnace where the heat was generated must be arranged immediately below the plant in which the heat was used, so that if a number of units were to be heated a separate furnace for each was essential in the majority of cases. A central heating furnace could not be installed to heat a number of units at different points in a factory, and even if this were possible the heat supply to each unit could not be individually controlled.

The use of molten lead might sound somewhat fantastic, but systems employing this fluid had been devised, and, Mr. Reavell believed, actually operated on an experimental scale. The sphere of utility, however, was very limited. In certain special cases a bath of molten lead might have useful applications, but the use of lead involved a number of insuperable difficulties. Neither water nor molten lead were suitable as heat transmission media and therefore there was only oil left.

The success of oil heat transmission in its numerous applications was easily explicable on theoretical grounds. Rate of heating in all processes was of fundamental importance in getting the most out of an installation of a given size, and the governing factors in this connection were the temperature gradient and the heat transfer coefficient. The product of mean temperature difference by the overall heat transfer coefficient was a measure of the rate of heating in any given problem. Two heating systems, therefore, could not be compared without taking both factors into account. Lantern illustrations were shown of the Kestner High Velocity Heat Exchanger.

## American Interest in British Patents

*To the Editor of* THE CHEMICAL AGE.

SIR,—I read with a great deal of interest the article by your Patents Correspondent, in the issue of THE CHEMICAL AGE for December 26, 1925, p. 651.

There are two processes mentioned as having been patented which interest me especially. One is given at the end of the first paragraph under the subdivision heading "Some Organic Products," and covers the oxidation of alcohols and aldehydes to the corresponding acids, aldehydes, and ketones. The other process is the one mentioned at the beginning of the second paragraph under the same subdivision heading and follows immediately after the one above-mentioned. This method covers the manufacture of formaldehyde by the oxidation of methane.

Will you be so kind as to give me the patent references to these two processes, the inventor's name, the company that it is assigned to, the number of the patent, and the date of issue? I shall be greatly indebted to you for this courtesy.—Yours, etc.

D. B. KEYES,
Director of Research.

U.S. Industrial Alcohol Co., Baltimore.
January 28.

[The patents referred to by our correspondent are the following: No. 236,086, W. Carpmael, 24, Southampton Buildings, London, W.C.2. Communicated by Dr. Karl Kaiser, 32, Kastanienalle, Berlin-Westend, Germany; applied for October 17, 1924; accepted July 2, 1925. No. 238,033, Dr. E. B. Maxted and B. E. Coke, Manor Road, Penn, Wolverhampton; applied for June 4, 1924; accepted August 13, 1925. Notices of these patents had previously appeared in our weekly Patent Literature.—ED. *C.A.*]

## "Problems of Ammonia Recovery"

*To the Editor of* THE CHEMICAL AGE.

SIR,—With reference to the remarks in an editorial note in your issue of the 6th inst., on "Problems of Ammonia Recovery," we observe that you express fears as to difficulties that may be encountered in oxidising ammonium sulphite to sulphate.

In case your remarks refer to the West-Jaques process, we beg to say that previous experience with other processes seems to us to have no bearing upon the subject. In the case of synthetic ammonia there is no difficulty in carrying out the oxidation, which proceeds to the extent of 70 per cent. or more in an hour. With coal ammonia, the impurities, if not removed, certainly slow down the oxidation, but on the other hand there is no devil liquor to be dealt with. From this point of view there is a large advantage to be gained in addition to the financial saving on account of sulphuric acid plant and manufacturing costs. The product under these conditions consists of a mixture of sulphate, sulphite, thiosulphate, and small amounts of organic impurities. The suitability of this material as a fertiliser will have to be decided by agricultural tests.—We are, etc., for

JAQUES, MORGAN AND WEST,
A. JAQUES,
J. S. MORGAN.

6, Fenchurch Buildings, E.C.3.
February 9.

## Circulation in Colloid Mills

*To the Editor of* THE CHEMICAL AGE.

SIR,—In your issue of the 6th inst. we note a letter from the makers of the "Circulator" Mill, in which they refer to Dr. Schotz's dictum with reference to circulating products through colloid mills.

As this is a matter of some interest to manufacturers, we should like to make some remarks based on our experience. In our opinion, it is much preferable to circulate any body of liquid much larger than that which is contained by one charge in a machine. This is advisable both to give an opportunity to effect cooling and, in the case of suspensions, to permit of the sedimentation of larger particles, which are returned to the machine more often than the finer particles.

Where a certain amount of heating is not harmful, we consider that the type of mill in which the materials under treatment remain between the working surfaces for any length of time at will, is preferable to circulating through a machine in which the particles are flung from the working space by centrifugal force, as in the former case each particle can be subjected to the disruptive forces of the mill during any number of revolutions of the rotor without any circulating.—Yours, etc.

SUN LANE ENGINEERING WORKS.
G. C. HURRELL.

Blackheath, London, S.E.
February 9.

## Society of Public Analysts

### New Officers for the Year

THE annual general meeting of the Society was held at the Chemical Society's Rooms, Burlington House, on Wednesday, February 3, when the President, Mr. G. Rudd Thompson, delivered his annual addresss. The following were elected as Officers and Council for the year 1926:—

President: E. Richards Bolton; Past Presidents, serving on the Council: Leonard Archbutt, A. Chaston Chapman, Bernard Dyer, P. A. Ellis Richards, Alfred Smetham, G. Rudd Thompson, E. W. Voelcker, J. Augustus Voelcker; Vice-Presidents: R. L. Collett, C. H. Cribb, E. M. Hawkins; Hon. Treasurer: Edward Hinks; Hon. Secretary: F. W. F. Arnaud; Members of Council: L. K. Boseley, H. E. Cox, John Evans, C. A. Hill, L. H. Lampitt, H. T. Lea, T. Macara, S. E. Melling, E. H. Merritt, W. H. Simmons, J. Sorley, J. White.

An ordinary meeting of the Society then followed, with the President, Mr. E. R. Bolton, in the chair.

Certificates were read for the first time in favour of Messrs. Sydney Back, B.Sc., A.I.C., Howard Henry Bagnall, B.Sc., F.I.C., William Percival Crocker, Bernard William Alfred Crutchlow, B.Sc., A.I.C., Alec Munro Ferguson, M.A., B.Sc., A.I.C., Ralph Henry Klein, A.I.C., Oswald James Walter Napier, M.A., A.I.C., George Stubbs, C.B.E., F.I.C., Joseph Hughes Williams, B.Sc., F.I.C., F.C.S., Kenneth Alan Williams, B.Sc., A.I.C.

Certificates were read for the second time in favour of Messrs. Guy Chignell, B.Sc., A.I.C., Hugh Gower Watts, B.Sc., A.R.C.S., A.I.C., and Dr. K. Saito.

The following were elected members:—Messrs. John Douglas Barrett, B.Sc., A.I.C., Arthur Lerrigo, B.Sc., F.I.C., Oscar Adolf Mendelsohn, B.Sc., Harold Edward Monk, B.Sc., A.I.C., Eric Voelcker, A.R.C.S.

### Abstracts of Papers

In a paper on "The Determination of Copper in Foodstuffs," by L. H. Lampitt, D.Sc., F.I.C., E. B. Hughes, M.Sc., F.I.C., C. H. F. Fuller, and P. Bilham, it was stated that the colorimetric method of determining copper as ferro-cyanide had been found more suitable than any of the other colorimetric methods tried. It was accurate to within about 5 per cent. A more exact method had been based on the fact that quinosol in neutral solution gave a quantitative precipitate with copper (Cu = 18·55 per cent.), in which one atom of copper appeared to replace two atoms of hydrogen in the quinosol molecule. Metals not precipitated by ammonia in excess did not give a precipitate with quinosol. The precipitated copper was determined by drying and weighing the precipitate or by an electrolytic method.

"The Occurrence of Arsenic in Apples" was dealt with by H. E. Cox, M.Sc., Ph.D., F.I.C. Attention was first directed to the recent outbreak of arsenical poisoning of apples, due to spraying with lead arsenate, as the result of two cases of illness. Only five out of 39 samples of Jonathan, King David, and Newtown apples were found to be free from arsenic, and 11 contained more than the statutory limit. The contamination was mainly, but not entirely, confined to the skin, arsenic having been found in the flesh of the fruit to the extent of about 3 per cent. of that on the skin. Notwithstanding statements to the contrary, it appeared that rain did not remove all the arsenic. Washing under the tap and even scrubbing was found to leave appreciable amounts of arsenic on the fruit, presumably owing to combination of the arsenic with the proteins of the skin.

A paper on "The Direct Titration of Thallous Salts with Potassium Iodate," by A. J. Berry, M.A., explained that thallous salts were quantitatively oxidised to the thallic con-

dition by potassium iodate in presence of a sufficient concentration of hydrochloric acid. The iodine liberated was oxidised to iodine monochloride, the hydrolysis of which was prevented by the hydrochloric acid. The end-point was found by frequently shaking the liquid with chloroform, the violet colour of the dissolved iodine disappearing when the reaction was complete. The presence of bromides did not interfere, the oxidisation of the iodine being complete before any liberation of bromine occurred.

"The Determination of Ascaridole in Chenopodium" was the subject of a paper by H. Paget, B.A. The usual methods of determining ascaridole by physical tests, it was stated, were liable to error owing to the presence of physiologically inactive products of ascaridole, and they might fail to detect certain adulterants. A method had been based on the reduction of ascaridole, which was an organic peroxide, by a standard solution of titanous chloride. Two samples of chenopodium oil thus examined contained 72 per cent. and 80 per cent. of ascaridole, whilst a third, which answered the requirements of the U.S. Pharmacopœia, contained only 48 per cent. and was found to be adulterated with cineole.

The water from the Hot Springs at Nasavusavu was stated by C. H. Wright, M.A., F.I.C., to contain mainly the chlorides of calcium and sodium, with smaller quantities of magnesium, potassium, sulphate and silica. It had maintained this general composition since 1876.

## Studies in Surface Action

### Second Lecture by Dr. Rideal

At the second of his two lectures at the Royal Institution of Great Britain on February 9, Dr. Eric K. Rideal (Owen Jones Lecturer on Physical Chemistry, University of Cambridge) discussed the properties of solid surfaces. The difficulty of accounting for many of the reactions that occurred on solid surfaces was due mainly to the fact that, whereas a liquid surface, however large, was perfectly uniform, most solid surfaces lacked uniformity over any considerable area; and allowance must be made for the variation of surface forces with the nature of the surface. The labours of Sir W. Bragg and his co-workers had given precise information on the distance apart of the ions and atoms in crystal faces. Surface energies varied in a marked manner from face to face. Since an atom situated in a plane was more fully saturated than an atom on a plane, it was clear that the adherence forces would be greater for atoms at the edges and corners of crystals than for any that might be in the planes forming the crystal boundaries.

These considerations were important when dealing with actions at solid surfaces which were clearly highly differentiated in respect of their surface energies. Whilst the exact determination of the various surface energies of a crystal was as yet an unsolved problem, the wide variation in the degree of unsaturation dependent on the texture of the surface was made manifest in various directions. Thus, in the process of crystal growth, only the most stable faces appeared, but if growth was accelerated and the surface-liquid interfacial energy lowered by the addition of some strongly adsorbed material such as gelatine, crystal facets were produced which normally did not appear. Octahedra could readily be produced on salt crystals and dendritic growths in a number of other salts. On solution, the atoms or ions possessing the least adhesion to the crystal torn away first, and thus there appeared complex facets and etch figures on partial solution of the corners and edges of a crystal, whilst the more stable planes were scarcely attacked. In chemical action in solids there was evidence that atoms or groups of atoms near the boundary or edge of a crystal were in a particularly reactive state.

#### Solid Catalysts

The variation in surface energy with the texture of a solid surface had an important bearing on the adsorption of substances by solids and on reactions which were catalytically accelerated by solids. If a metal such as copper be prepared from its oxide by reduction at various temperatures, it was found that the lower the temperature of reduction, the less crystalline it appeared under microscopic examination, a conclusion supported to some extent by X-ray analysis, which indicated a preponderance of micro-crystals. At the same time, the amount of gas adsorbed at saturation decreased with rise of the temperature. Metals reduced at high temperatures were almost inactive, and *vice versa*. If these three facts were considered in the light of our knowledge of the alteration in the surface energies of surfaces as affected by the atom packing, it must be concluded that metals reduced at various temperatures did not possess uniform surfaces, but contained patches of varying surface activities. It was probable that these activities, as measured by the catalytic powers, heats of adsorption, etc., did not vary continuously in value, but certain large proportions of the total area were uniform in activity, corresponding to a preponderating quantity of one or other crystal facet or edge, formed readily under the influence of the forces of crystallisation.

This point of view, though urged by many investigators, was not generally accepted, partly because of ignorance as to what was actually meant by saturation of a uniform surface. Langmuir's opinion that in general adsorbed layers were but one molecule thick could no longer be upheld. There was evidence that vapours, and possibly gases with large values of the molecular cohesion, could be adsorbed in multi-molecular layers, the strength of adhesion of the layers decreasing with increase of distance from the surface. Investigations on catalysis had led to the process of selective poisoning, as a method of demonstrating that patches of various activities existed, and that catalytic action was confined at low temperatures to the strongly adsorbed uni-molecular layer. Investigation of the amount of poison required to poison a catalyst completely for a definite reaction had shown that only a small fraction of the total surface was covered by the poison.

#### Promotors

Catalytic promotion, a phenomenon of great technical importance in heterogeneous catalysis, was then discussed. Only a small active patch was responsible for the whole of the catalytic activity of a catalyst. This patch might be increased both in area and stability by suitable methods of dispersion or support, and its activity depended on the nature of the atomic packing in or on the surface. The specific activity of a group of atoms was thus dependent on their distance apart from their neighbours and the nature of the latter. Thus, mixed solid surfaces, such as Pt-Pd, Cu-Pd, Fe-C, N-C, Fe-N-C, or zinc and chromium salts were more active than the surfaces formed by either component. In the modern synthesis of methyl alcohol from water gas a very active catalyst might be prepared from mixtures of zinc oxide and chromium oxide, permitting of operation at relatively low temperatures. Whilst technical operation was round about 400° C., reactions could occur at lower temperatures, and he had calculated by thermo-chemical methods that at 327° C., for total pressures of mixed gases of 1, 10·1, and 225 atmospheres, the partial pressure of methyl alcohol was $9{\cdot}5 \times 10^{-2}$, 0·125, and 125 atmospheres respectively, the yield being enormous. Investigations were proceeding to determine the specific activities of these mixed surfaces; thus, carbon promoted with iron, used in the oxidising of oxalic acid, was more than 39 times as active as a carbon-carbon active patch.

They did not know how the catalyst effected the activation of the adsorbed molecules, but it was clear that some type of union between adsorbate and substrate was formed. The fact that energy could be conveyed from substrate to adsorbate was thus demonstrated experimentally: silicon, when undergoing oxidation with permanganate, gave off light. In the experiment a quantity of the fluorescent dye, eosine, was permitted to be adsorbed into the silicon surface, and potassium permanganate was added. The light emitted was the fluorescent light of the eosine, so that the energy of oxidation of the silicon had been imparted to the adsorbed eosine, and had rendered it active. Thus, the link with the surface must be of an intimate character. There appeared to be, in the case of metals, an intimate connection between catalytic activity and thermionic emission. Much remained to be learned about the influence of the spacing of the atoms in solid surfaces on the reactivity of the surfaces in general. The surface of a solid consisted of all types of angles, edges and planes, and, whilst one could prepare a liquid surface of the same characteristics day after day, the reproduction of a standard solid surface was a matter of very great difficulty, and it was necessary to devise methods to overcome the variations.

## Problems of Technical Emulsions

### Paper by Dr. William Clayton

PROFESSOR W. H. ROBERTS presided at the meeting of the Liverpool Section of the Society of Chemical Industry, held at the Liverpool University on Friday, February 5, when a paper on "Considerations relating to Technical Emulsions" was read by Dr. WILLIAM CLAYTON.

Dr. CLAYTON gave an outline of the theoretical principles which underlie emulsions, and said that two immiscible liquids could form two series of emulsions depending on which liquid formed the internal phase, in other words, which liquid was dispersed as globules in the other, the latter acting as the internal phase. Solids in powder form and colloids in solution acted as emulsifying agents; in both cases the emulsifying agent was adsorbed at the liquid to liquid interface. The interfacial tension was reduced and the transition from one to another was rendered less abrupt. In the case of solids, the wetting by the liquids was the important phase, the liquid which exercised preferential wetting being the external phase. In the case of colloids in aqueous solution the water was the external phase. Oil-soluble colloids promoted dispersion of water in oils as organic liquids.

Dealing with the mechanics of emulsification, Dr. Clayton said that little attention had been paid to the empirical fact that with a given machine there was an optimum degree of agitation in emulsification. He described various types of emulsifiers, and alluded to the advantage of colloid mills in homogenising. References to butter and margarine were illustrative of the importance of phase type, and by the aid of lantern slides, the influence of salting and even working was illustrated. Under the heading of de-emulsification the use and limitations of the centrifuge were pointed out, and the lecturer added that the breaking of emulsions by the use of alternating current and direct current found frequent application in dealing with crude petroleum emulsions containing emulsified water.

Aeration and frothing, Dr. Clayton pointed out, were used in the recovery of wool fat from wool-scouring liquors. The addition of small quantities of water-soluble colloids caused rapid creaming of milk and rubber, but a more general method of separating emulsions was to add colloids which alone promoted the opposite type of emulsion to that being handled. The antagonistic action of the opposite type emulsion protectors led to a serious disturbance of equilibrium, and separation occurred, and the actual inversion of the emulsion type was easily accomplished.

#### Discussion

Mr. E. T. WILLIAMS remarked in discussion that he was astonished at hearing that there was an optimum concentration. As to the breakings down, as far as he could see in the case of soap, there was nothing else for it but that a solid globule of soap was formed on the interface of the medium.

Mr. W. A. DAMON said that frequently an emulsion of water and water-gas tar contained 70 per cent. of water, and the proportion of free carbon in such a case must be very small. He instanced a case in which a sample of creosote contained 40 per cent. of water and was exceedingly stable, and nothing seemed to move it. Alternating current was tried, but the oil drew out of phase and let the current pass it.

Dr. CLAYTON said that possibly the water-gas carbon contained properties quite different from those they put in. If there was any difference in the carbon as regarded emulsifying properties they would, of course, get a difference in the breaking of the emulsions. If water-gas tar was sprayed into warm water they got an emulsion, but with an excess of water the change did not take place.

Mr. E. GABRIEL JONES said that it had been suggested that there was a covering membrane on the globules formed in the case of emulsions and hot water. Emulsions in ether were very often broken down by a little alcohol. He asked was it not possible that the influence of the metal would break down the emulsions in the case of milk in transit.

Dr. CLAYTON said the question of the membrane round the globules of an emulsion had not been solved. As regards the breaking of milk in transit, details were not sufficient to explain it. If the containers were full one could not see any reason for it, and if only partly full, the emulsive oil might get to the liquid interface. It had, however, been shown that with air the liquid broke down by the action of a coil at the interface.

## Sulphur Compounds of Shale Oil

### Discussion by Petroleum Technologists

AT the ninety-first general meeting of the Institution of Petroleum Technologists at the Royal Society of Arts on February 9, a paper on "The Sulphur Compounds of Kimmeridge Shale Oil," by Frederick Challenger, D.Sc., Ph.D., F.I.C., John Haslam, M.Sc., A.I.C. (late Dalton Scholar of the University of Manchester), Randle James Bramhall, B.Sc., and James Walkden, M.Sc., was read by Dr. Challenger.

The authors stated that the technical literature contained many references to the difficulty experienced in removing the sulphur compounds which were present in the crude Kimmeridge shale oil of Dorset.

So far as they were aware, the numerous attempts to reduce the percentage of this undesirable element had been made without any knowledge as to the mode of combination of the sulphur. Although there was much to be said in explanation of this mode of procedure, it could hardly be considered as the one most likely to lead to satisfactory results. During the late war various papers dealing with the difficult problem of sulphur in shale oil were read before the Institution of Petroleum Technologists, and opinions were expressed by the authors, or by those who took part in the discussion, as to the nature of the sulphur compounds present. Owing, perhaps, to the exigencies of the situation at that time, no experimental evidence was submitted, and since then no further communications had been made on the subject. In his book entitled *Non-Benzenoid Hydrocarbons* (1922), Dr. B. T. Brooks stated that nothing was known as to the nature of the sulphur compounds of shale oil. The present authors had attempted the identification of the sulphur compounds contained in the oil.

Before describing the chief results obtained in this investigation, it was useful to indicate briefly the experience gained by other workers on the sulphur compounds of mineral oils up to the end of 1922. It would then be seen that the information actually accumulated was very considerable, and that, without any experimental work whatever, a survey of the literature would have yielded perhaps not definite conclusions, but certainly strong indications, as to the nature of the sulphur compounds. It was, of course, obvious that the study of the sulphur derivatives in coal tar must have a close bearing on the composition of those in shale oil. The literature was surveyed at considerable length, much emphasis being laid on the work done by Mabery on the sulphur compounds of various American petroleums.

#### Fractionation of the Oil

Most of the sulphur compounds were in that part of the oil (about 30 per cent.) which was volatile with steam. This was purified and distilled at atmospheric pressure until the temperature reached 180° C., when the distillate was submitted to repeated fractionation at atmospheric pressure with an efficient column. The product of b.p. above 180° was similarly fractionated at 27 mm. The residue which was non-volatile in steam was extracted with ether, whereby a considerable amount of a black solid containing about 50 per cent. of mineral matter was removed, and the solvent evaporated. Up to the present this high boiling residue had received very little attention. The less volatile portion lost hydrogen sulphide even *in vacuo*, and only relatively very small quantities of wax-like solid m.p. 62–63°, which was free from sulphur, separated from the distillate.

#### Discussion

Dr. Dunstan and Mr. J. E. Hackford pointed out that any free sulphur present might react with the hydrocarbons; and that thiophens might be formed otherwise than by the reaction of acetylenes with sulphur.

Mr. S. C. Craven said that the indophenin reaction for the characterisation of thiophens was unreliable.

Dr. Challenger, in reply, discussed the formation of thiophens. He had found that the indophenin reaction broke down in the presence of unsaturated hydrocarbons.

The Chairman, Sir Thomas Holland, announced that the Council had awarded the Redwood Medal to Mr. Macarthy Jones, and the Student's Medal to Mr. E. Clark. The first draft of certain suggested alterations in the bye-laws was read.

## University Training for Chemists

### Fundamental Principles or Specialised Tit-bits

THERE was a large and representative attendance at the annual dinner, under the joint auspices of the Birmingham and Midland sections of the Society of Chemical Industry and the Institute of Chemistry, held at Birmingham, on Saturday, February 6. Professor A. R. LING, head of the Biological Department of Birmingham University, and chairman of the Birmingham Section of the Institute of Chemistry, presided, and those present included Sir R. Threlfall, Mr. W. J. U. Woolcock, Professor G. T. Morgan, Professor W. N. Haworth, Mr. R. L. Collett, Dr. W. E. Sumpner, Dr. A. Parker, Dr. W. Wardlaw, Mr. S. R. Carter, Captain E. C. Bennison, Mr. T. Barclay, Mr. W. A. S. Calder, Dr. H. W. Brownsdon, Mr. A. W. Knapp, Mr. W. T. Collis, Mr. J. C. Mann, Mr. E. C. Rossiter, Dr. J. D. Main Smith and Dr. H. D. K. Drew.

Sir RICHARD THRELFALL, in proposing "The Society of Chemical Industry," said the Society of which he was an original member was started with great enthusiasm, and in his county, Lancashire, men said what they thought to each other about the Society. The age of reticence had not then set in, and much valuable information was disseminated. The Society to-day was one of the largest in the world; they were proud of it.

Mr. WOOLCOCK, replying as President of the Society, said that during the past year there had been some stocktaking with regard to the chemical industry, which operated over an enormous field. The industry represented a prodigious capital, and he noted with satisfaction that, whilst the pre-war production of fine chemicals in this country was 70,000 cwt. (the remainder being imported) the production in this country during the past five years had risen to nearly a quarter of a million cwt. The different chemical substances made in this country before the war numbered 1,400; to-day they numbered between 2,600 and 2,700. The influence of the Safeguarding of Industries Act had been extremely good. The Society was in robust health, and was progressive. It was capable of rendering great service to the industry, and of co-operating effectively with other scientific bodies. He hoped the effect ultimately would be to reduce their number.

#### Tribute to Dr. Morgan

Professor W. N. HAWORTH (Chemical Department, Birmingham University) paid a tribute to the splendid work done in the Department of Chemistry by Dr. G. T. Morgan, and to his public spirit and energy exerted on behalf of the various chemical organisations. They wished him success in his new sphere. Personally, he would do everything he could to maintain the high traditions of the chemical school. All branches of chemistry were out to make chemistry a great factor in this country, and also to serve the state and the nation. They felt that chemistry was a study which a man could make his life work, and one in which, if he achieved success, could be as satisfying as any profession in which a man might engage. They of the University sometimes heard the suggestion that the type of training they gave to chemists was not the most appropriate, and they were told that what they should give was a little of this and a little of that, and that that was what the manufacturer wanted. Such an attitude raised the question of whether, in training for any branch of their great profession, there should be any whittling down of the great fundamental principles which they taught in chemistry. Having given this subject a great deal of thought he was bound to say that he did not agree with those who favoured the scattering of their energies over a wide field. After all, what they were out to do at the University was adequately to train the mind, and to instruct thoroughly in the fundamental principles underlying chemistry.

#### Jubilee of the Institute

Replying to the toast "The Institute of Chemistry," which the professor proposed, Mr. R. L. COLLETT, assistant secretary of the Institute, expressed the hope that next year when they celebrated in Birmingham the Jubilee of the Institute, Professor Haworth would be able to speak on its behalf. He had hoped to report that their membership had reached 5,000; it was, however, a little short of that figure, but he believed it would be reached shortly. Members and Fellows of the Institute were entitled to be treated as professional men; and they recognised that they were bound to adhere to a certain standard of professional decorum. The Institute would never cease to push those claims for full recognition before the public. He pleaded for a closer co-operation between the Chemical Society, the Society of Chemical Industry, and the Institute.

No industry was absolutely independent of their science; and the tendency of industry to invoke the aid of science was growing enormously. Thus full recognition of the chemist in the public mind was essential. The Institute was doing a great work in helping members who were suffering from temporary misfortune, and also in obtaining situations for unemployed men. The worst period of unemployment was at the beginning of 1924. The number of members unemployed to-day was almost exactly half what it was then in spite of the fact that the Institute membership was constantly growing. In conclusion, he acknowledged the splendid work done on behalf of the Institute by Mr. R. B. Pilcher.

The toast "Our Guests," was submitted by Professor LING, who expressed their special indebtedness to Dr. Morgan for coming specially from Teddington, and he hoped that his work in the Government Laboratories would be as congenial as it was successful.

## Chemical Matters in Parliament

#### Artificial Silk Trade Marks

Sir P. Cunliffe-Lister (House of Commons, February 4), in reply to Mr. Duckworth, said that registered artificial silk marks might occasionally conflict with existing cotton goods marks, but they were all open to opposition before registration. Subsequent protest was also permissible, but no opposition had been registered against artificial silk marks.

#### Costs of Patent Office

Sir P. Cunliffe-Lister (House of Commons, February 4) said that Patent Office costs were—1924, £395,952, staff 697; 1914, £236,767, staff 673. The whole cost was more than covered by receipts.

#### Hours in Industry

Mr. Betterton (House of Commons, February 4) said that he could not say when the proposed International Conference would be held—perhaps in next month. The whole question as raised by the Washington Conference was being considered.

#### Revenue from Silk Duties

Mr. Ronald McNeile (House of Commons, February 8), in reply to Mr. Remer, said that the total net revenue (after deducting export drawbacks and other repayments) derived from the silk and artificial silk duties up to January 31 was £2,163,100, of which Excise duty on artificial silk contributed £446,800.

#### Poison Gas Experiments

Sir L. Worthington-Evans (House of Commons, February 9), in reply to Mr. Thurtle, said that poison gas experiments were still being carried on by the War Department.

Sir L. Worthington Evans, in a written reply to Mr. C. Wilson, says the numbers and species of animals used during the period May 14, 1923, to January 31, 1926, in gas poisoning experiments in this country were as follows: Rabbits, 1,136; rats, 227; goats, 58; guinea pigs, 406; cats, 124; monkeys, 6; mice, 176; horses, 5; total, 2,138. Of this total 447 were destroyed by or immediately after the experiment; 1,132 (excluding afore-mentioned) were destroyed within one month, 345 suffered no harm, and the remainder were either destroyed more than one month later or have been used at such a recent date that they cannot be classified in the foregoing categories.

#### World's Sugar Production

Sir P. Cunliffe-Lister (House of Commons, February 9) said that according to estimates published by Willett and Gray, the quantities of raw sugar produced in the crop season 1924-25 were as follows:

| | Total world production. | Produced in British Empire. | Per cent. produced in British Empire. |
|---|---|---|---|
| | Million Tons. | Million Tons. | |
| Cane sugar ..... | 15·5 | 3·7 | 23·9 |
| Beet sugar ..... | 8·1 | 0·06 | 0·7 |
| Total ..... | 23·6 | 3·8 | 16·0 |

# From Week to Week

SIR MAX MUSPRATT lectured on "Chemistry and Civilisation" at Oxford University last week.

THE NEW PLANTS of the Aluminium Corporation at Chute a Caron, Quebec, will be completed by the end of 1926, according to the Vice-President of the Corporation. Some eight thousand men will be employed by the Corporation.

SIR JOHN BRUNNER was on Friday, February 5, openly approached to accept the Liberal candidature for Northwich division. He stated that he was immersed in business duties and for the present the difficulty in the way of his acceptance was insurmountable.

AN ARTIFICIAL YARN is reported to have been produced by the Glanzstoff-Fabriken, known as "VL yarn," of which Professor Herzog, of the Danlem Laboratory of Textile Research, speaks highly. Warmth, tensile strength, and elasticity are said to be features of the "VL yarn."

DR. G. C. CLAYTON, M.P. for Widnes and a director of the United Alkali Co., was down to introduce on Friday the first private members' Bill of this Parliamentary session. It is the Re-election of Ministers' Bill, and it is intended to obviate the necessity of a member having to stand for re-election on appointment as a Minister of the Crown.

SIR ALFRED MOND was the guest of the 1924 Club at Liverpool on Thursday, February 4, but the proceedings were private. Sir Max Muspratt was present.—Sir Alfred has been invited to become Conservative candidate for the Carmarthenshire Division.—Sir Alfred and Lady Mond have left for a holiday on the Riviera which is expected to extend to two months.

AN ADJOURNMENT of the inquest into the death of James Lee, Rochdale, dye worker at Red Clough dyeworks, was ordered by the Manchester coroner on Monday. The man was stated to have died from toxic jaundice, and the Inspector of Factories is to examine the composition of a certain powder used in the manufacture of red dye. The man had complained of fumes from it.

COMMENTS ON THE PROPERTIES OF INSULIN were made by Dr. W. R. A. Asplen at a Kenilworth inquest on Thursday, February 4. He said that he had given insulin injections twice daily. Its cumulative effect was very bad for the nerves and patients got to dread it. Insulin was an extraordinarily interesting scientific discovery, but his experience was that the treatment was almost worse than the disease.

DR. PARKER, research chemist at Leeds University and the Institution of Gas Engineers, read a paper on "The Smokeless Fuel Problem" before a joint meeting of the British Sections of the Society of Chemical Industry and the Institute of Chemistry. Recent researches, he said, had shown every prospect of the gas companies producing a solid smokeless fuel possessing all desired qualities, including ease of ignition.

A DECISION AGAINST H. A. Metz and Co. in their case against the United States has been made by the U.S. Court of Customs Appeals. In the reappraisement of certain alizarine blue-black dyes the importer protested that the dyes were not properly appraisable on the American selling price of an alleged competitive article. The Board of General Appraisers overruled the claim of the importer and the Customs Court has affirmed the ruling of the Board.

AN AMERICAN OIL MERGER is announced. In consideration of 165 million dollars Blair and Co. and the Chase Securities Corporation have obtained control of the Associated Oil Co. at 59 dollars per share. No announcement is made as to what will be done with the Associated Oil Co., but it is thought extremely likely that it will be combined with other oil properties in which the same bankers are interested, such as the California Petroleum Co. and the Pan-American Petroleum Transport Co.

A WRIT is reported to have been issued by Dr. Henry Dreyfus, managing director of British Celanese, Ltd., charging Mr. A. Loewenstein, Sir J. Dunn, Mr. Popelier, and the Turbize Co. with conspiracy and fraud. The dispute arose out of allegations made by Mr. Loewenstein at a meeting of Cellulose Holdings and Investment, Ltd., and British Celanese shareholders on December 10 last. Mr. Loewenstein has instructed his solicitors to say that he will be very pleased to deal with Dr. Dreyfus's charges.

ON MONDAY, IN THE COMMERCIAL COURT, King's Bench Division, Mr. Justice Roche commenced the hearing of an action by the Anglo-Celtic Shipping Co., Ltd., of Cardiff, against Elliott and Jeffery, of Bute Docks, Cardiff, and Thompson and Co., chemical manufacturers, of Emissary Works, Walton, Liverpool, claiming in respect of damage caused by an explosion in the s.s. *Oakfield*, owned by the plaintiffs. The steamship was undergoing repairs at Elliott and Jeffery's shipyards in December, 1924. The second defendants were joined as defendants as it was alleged that "Pluperfect" liquid, which they manufactured, was used for cleaning the engine-room condensers, and was the cause of the explosion. Plaintiffs said they used the "Pluperfect" in the condensers as directed and closed them. The following day a manhole was opened and when a man passed with a naked light there was an explosion and the man was injured, whilst damage was done to the ship. The hearing was adjourned.

JAMES GORDON AND CO., LTD., engineers and contractors, Windsor House, Kingsway, London, inform us that Mr. J. J. Lassen has retired from the board of directors and has no further interest in or connection with the company.

FOR FAILING TO ABATE SMOKE NUISANCES the following firms were fined sums ranging from 20s. to £3 at Manchester on Wednesday:—J. Lancaster (Manchester), Ltd., calico printers; Cochrane and Sons, Ltd., dyers; and The Clayton Aniline Co., Ltd.

DURING AN OPERATION at Mansfield Hospital on Saturday, February 6, a bottle of ether was knocked over and broken. The vapour spread to a fire some 14 ft. away and an explosion was followed by a fire. The patient died from injuries received in the fire.

THE DRYING OF VEGETABLES was the subject of a paper by Mr. A. W. Knapp before the Birmingham and Midland Section of the Society of Chemical Industry. Dried vegetables, he said, had only a small vitamin content and stored dried vegetables lost almost all their anti-scorbutic properties.

FOR ATTEMPTING TO EVADE CUSTOMS DUES on 448 lb. of saccharin and for harbouring 100 lb. of saccharin Johannes Jacobus Sophias Jut, of Rotterdam, was fined treble value and duty, amounting in all to £5,383, at the Mansion House on Thursday, February 4, or in default six months' imprisonment. The saccharin was hidden in sacks of flour.

SIR WILLIAM BRAGG has been appointed by the Council of the Senate of Cambridge University as one of the five Judges-delegate to hear the appeal of Mr. J. B. S. Haldane against the sentence of the Vice-Chancellor and the Sex Viri which deprived him of his office of Reader in Bio-Chemistry at Cambridge. This step was taken following a recent Divorce Court judgment.

MR. A. MARKS, F.I.C., who has been appointed Research Chemical Engineer of the Chilian Nitrates Research Association, was on Friday February 5, presented with a testimonial by the Council of the Birmingham Branch of the Institute of British Foundrymen in recognition of his services in presenting technical papers and contributing to the discussions on metallurgical and allied subjects.

THE CAUSE OF THE EXPLOSION in the "corning" house of the powder works of Curtis and Harvey on January 27, when two men were killed, is still unknown. At the conclusion of the inquiry on Tuesday a verdict of accidental death was returned.—A similar verdict was also returned at the inquest on Monday on the victims of the explosion at the celluloid works of the British Xylonite Works, Walthamstow, on January 29.

WILLIAM JACKS AND CO., of Winchester House, Old Broad Street, London, inform us that the private limited liability company of William Jacks and Co., Ltd., trading at Glasgow and elsewhere, has gone into voluntary liquidation and that the liquidator has sold the goodwill of this company to them. In future the offices in Glasgow and Middlesbrough will be conducted under the name of William Jacks and Co. instead of William Colvin and Co.

THE PROSPECTUS FOR 1926-27 of the Imperial College of Tropical Agriculture, of Trinidad, British West Indies (London Offices: 14, Trinity Square, E.C.3), includes an account of various investigations, of which some are of bio-chemical interest, which are being carried out. The governing body of the College are making an appeal for £45,000 for the provision of a hostel for the students, and an estate on which the business side of farming will be taught.

THE NEW ZEALAND SOUNDS NITRATE SYNDICATE has been granted a sixty years' licence by the N.Z. Government to generate at Smith's Sound a force of 300,000 continuous h.p., 50,000 of which is to be developed within seven years, while the construction of works to generate the balance must be begun within ten years. The Government retains the right to resume possession with compensation at the end of thirty years. The power is to be used for electro-chemical, metallurgical, and other purposes.

### Obituary

MR. W. F. M. MCCARTHY, at Baltimore. He studied with Chevreul and was recently a director of the Canadian Nitro Products Co. Aged 85.

MR. GORDON H. FRASER, managing director of the Pearson and Knowles Coal and Iron Co., Ltd., and director of Rylands Brothers, Ltd., Warrington, the Partington Steel and Iron Co., Ltd., Ireland, aged 49, following an operation in London.

SIR J. B. HARRISON, F.I.C., Georgetown, Demerara, on Monday, aged 69. He was Director of the Department of Science and Agriculture in British Guiana. He went to Barbados in 1879 as professor of chemistry and agricultural science. In 1889 he was appointed Government analyst and professor of chemistry for British Guiana, which post he held until 1905, when he received the appointment already mentioned.

It will be recalled that Sir John last year reported to THE CHEMICAL AGE an account of an explosion in the workings of an old metalliferous mine on the Puruni river. It was discovered that the only feasible explanation was the anærobic action of water in the mine upon supporting timbers. Tests were made and the gas on analysis was found to be a mixture of approximately two volumes of methane and one volume of hydrogen. (See THE CHEMICAL AGE, Vol. XII, No. 312; Vol. XIII, Nos. 319 and 332.)

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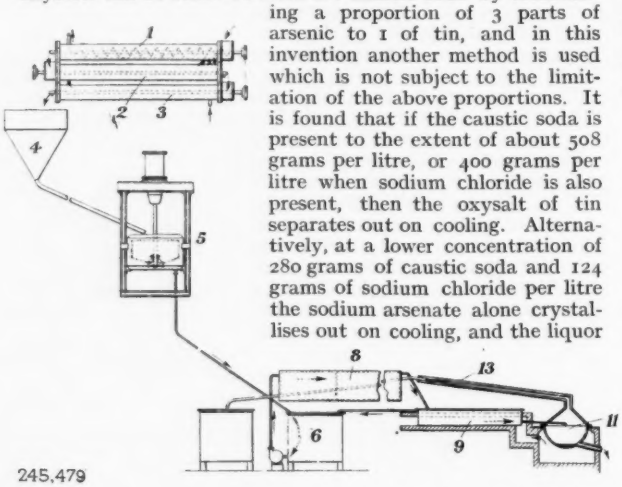
*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each*

## Abstracts of Complete Specifications

245,479. ALKALI LIQUORS, TREATMENT OF. H. Harris, 54, New Broad Street, London, E.C.3. Application dates, August 8, and September 20, 1924.

This process is for treating alkali liquors obtained in processes for the purification of molten lead by circulating it through a molten reagent such as caustic soda, sodium chloride, and sodium nitrate. The impurities are removed from the reagent, which is used again. Specification No. 213,638 (See THE CHEMICAL AGE, Vol. X, p. 495) shows how arsenic and tin oxysalts can be removed from the caustic soda by establishing a proportion of 3 parts of arsenic to 1 of tin, and in this invention another method is used which is not subject to the limitation of the above proportions. It is found that if the caustic soda is present to the extent of about 508 grams per litre, or 400 grams per litre when sodium chloride is also present, then the oxysalt of tin separates out on cooling. Alternatively, at a lower concentration of 280 grams of caustic soda and 124 grams of sodium chloride per litre the sodium arsenate alone crystallises out on cooling, and the liquor



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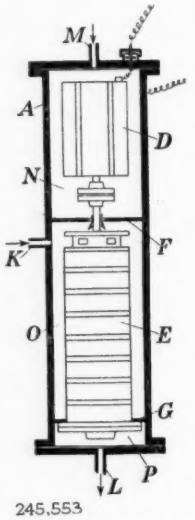
is then further concentrated to render the stannate insoluble. In another alternative, the stannate may be first separated at the higher concentration while hot, and the liquor is then cooled and diluted to precipitate the arsenate and any remaining stannate. The crystals are then treated to separate the two salts.

Special apparatus is employed for cooling the large volumes of solution containing bulky masses of crystals. The solution is fed to open water-cooled troughs 1 containing rotary conveyors and then to water-cooled sets of tubes 2, 3, arranged in series and cooled by water in counter current. The liquid passes into a receiver 4 and thence to a centrifuge 5, or filter press. The solids in the centrifuge may be treated with water to dissolve the arsenic and tin, leaving any antimony insoluble. The solution is then treated for the recovery of arsenic and tin. The filtrate containing caustic soda, sodium chloride, and nitrates or nitrites, is run into a large tank 6, pumped continuously through a heat intercharger 8, and thence finally to a heating tank 9 in the flue of a flash boiler 11. This comprises a heated vessel containing molten lead which is not readily acted upon by the solution, and the steam is discharged through a heat insulated pipe 13 to the heat interchanger 8. The hot solution from the tank 9 falls through a jet on to the surface of the molten metal at such a rate that instantaneous evaporation takes place, and solid caustic soda collects.

245,553. CARRYING OUT CIRCUIT REACTIONS UNDER VERY HIGH PRESSURES, PROCESS AND APPARATUS FOR. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, November 12, 1924.

It has been found that for circuit reactions under very high pressures (100–1,000 atmospheres), *e.g.*, the synthesis of ammonia, it is important to arrange the electro motor and the pump in a high pressure vessel forming part of the circuit. In this case a multi-stage centrifugal pump may be employed to produce the excess pressure of about 20 atmospheres necessary to force the reaction gases through the contact mass. The motor must be surrounded by indifferent gases only, such as nitrogen and hydrogen, and must not come into contact with ammonia.

A pressure-resisting vessel A is divided by a partition F into two compartments N, O, containing the motor D and centrifugal pump E respectively. The fresh gases, free from ammonia, are introduced at M, and the circulating gases which may contain some ammonia are introduced into the compartment O at K. A slow flow of inert gas thus takes place through the compartment N. The casing of the pipe is secured to the partition G, and the circulating gas is forced by the pump into the space P and thence through the outlet L to the ammonia apparatus. If the gases employed are not detrimental to the motor, the partition F may be dispensed with.



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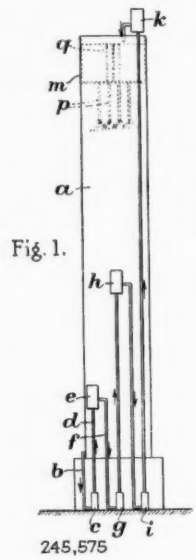


Fig. 1.
245,575

Fig. 2.

245,575. REMOVING SULPHURETTED HYDROGEN FROM GAS, APPARATUS FOR. Woodall-Duckham (1920), Ltd., E. W. Smith, and T. C. Finlayson, 52, Grosvenor Gardens, London, S.W.1. Application date, December 10, 1924.

This process is of the kind in which the gas is washed with sodium carbonate solution containing ferric hydroxide in suspension, and the spent liquor is regenerated by blowing air through it. This improvement relates to the regeneration of the spent liquor.

The gas is treated in the absorption tower *a*, and the liquor charged with sulphide flows through a pipe *b* to an emulsifier *c* where it is mixed with air, and the emulsion rises in the pipe *d* in the manner of an air lift to the separator *e* in which the air is removed. The liquor returns through the pipe *f* to a second emulsifier *g* of a similar air lift, in which the air is separated at *h*, and the liquor is again similarly treated in an air lift *i*, *k* from which the liquor passes to a compartment *l* in the tank *m*. The process may be repeated in another air lift which delivers the liquid to another compartment *n* in the tank *m*, and then if required in another air lift which delivers it to a compartment *o*. The liquor finally flows into distributors *p* of the absorption tower. The separated sulphur is discharged into a pipe *q*.

245,584. QUINIZARIN, PRODUCTION OF. H. Dodd, W. C. Sprent, and The United Alkali Co., Ltd., Cunard Building, Liverpool. Application date, December 29, 1924.

The condensation of phthalic anhydride with orthochlorphenol in sulphuric acid solution in the presence of boric acid yields a mixture of chlorhydroxy-anthraquinone and quinizar-

in. The object is to convert this mixture to a commercial quinizarin in which the chlorine content is reduced to the order of an impurity, which is effected by prolonged action of boric and sulphuric acids above 200° C.

In an example, a mixture of orthochlorphenol and sulphuric acid is heated to 90°–100° C. for one hour, and a mixture of phthalic anhydride, boric acid, and sulphuric acid then added. The temperature is raised gradually to 250° C. during 16 hours. The excess of phthalic anhydride distils off, and the mixture is cooled to 40°–50° C. and run into cold water. A yield of 88 per cent. of quinizarin is obtained.

245,623. Vat Dyestuffs, Manufacture of. O. Y. Imray, London. From Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. Application date, February 16, 1925.

Specification No. 192,842 (See The Chemical Age, Vol. VIII, p. 291) describes the preparation of condensation products from a para-oxyphenazine or a naphthosultam-3 : 4-phenazine and a mono- or dichloro-1 : 4-quinone or a mono- or dichloro-4-naphtho-sultamquinone or a substitution product. In this invention, a para-oxyphenazine, a para-aminophenazine, a para-NH-arylphenazine, a para-NH-alkylphenazine, or a naphthosultam-3 : 4-phenazine is condensed with a halogen-free 1 : 4-quinone or an ortho-oxy-1 : 4-quinone, preferably in the presence of water-binding agents. These products are dyestuffs or can be converted into dyestuffs by treating with chlorine lye or another oxidising agent. Examples are given of the condensation of (1) 2-chloronaphthosultam-3 : 4-phenazine and 1 : 4-naphthoquinone, and subsequent oxidation with chlorine lye, (2) naphthosultam-3 : 4-phenazine and benzoquinone, (3) 1-oxynaphthalene-3 : 4-phenazine and benzoquinone, (4) 1-amino-naphthalene-3 : 4-phenazine and 1 : 4-naphthoquinone, (5) 1-oxynaphthalene-3 : 4-phenazine and β-oxy-1 : 4-naphthoquinone, (6) naphthosultam-3 : 4-phenazine and β-oxy-1 : 4-naphthoquinone, (7) 1-oxy-2-chloro-naphthalene-3 : 4-phenazine and β-oxy-1 : 4-naphthoquinone, (8) 1-phenylaminonaphthalene-3 : 4-phenazine and β-oxy-1 : 4-naphthoquinone.

245,633. Separation of Low Temperature Tar into Hydrocarbons and Phenols, Process for. H. E. Potts, Liverpool. From Zeche Mathias Stinnes, 1A, Beisingstrasse, Essen, Germany. Application date, March 7, 1925.

Low temperature tar is treated with 56 per cent. alcohol, and gaseous ammonia is passed through until the mixture is saturated, the heat of absorption being removed by cooling. A separation into two layers occurs, the upper containing neutral oils with little alcohol and ammonia, and the lower containing the phenols in aqueous, alcoholic, and ammoniacal solution.

In an example, low temperature tar distillates boiling between 180° C and 250° C. containing phenols 32 per cent., basic compounds 2 per cent., and neutral oils 66 per cent. is treated as above, and the two layers separated. The phenolic solution is distilled at 90°–95° C., and the alcohol, ammonia, and part of the water driven off. The phenols separate on cooling and are washed with acidified water. The other layer is heated to 180° C. to remove alcohol and ammonia, leaving neutral oils. A yield of 94 per cent. phenols having a purity of 99 per cent. is obtained, and a yield of 99 per cent. of the hydrocarbons containing 5 per cent. phenols. This process requires a much smaller quantity of alcohol.

245,674. Azo Dyestuffs, Manufacture of. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, July 13, 1925.

These dyestuffs are obtained by introducing one or more sulphonic acid groups into the azo dyestuffs from a diamino-diaryl-urea and two molecules of salicylic acid, or its homologues or derivatives. The unsulphonated dyestuffs may be sulphonated in the usual way, or tetrazotised sulphonic acids of a diamino-diaryl-urea are combined with a salicylic acid body, or the amino azo dyestuff amino-arylene-sulphonic-acid-azo-salicylic-acid body is treated with phosgene. According to examples (1) the disazo dyestuff obtained from *p.p.*[1]-diamino-diphenyl-urea and two molecules of salicylic acid is treated with fuming sulphuric acid, (2) the sodium salt of the azo dyestuff from diazotised *p*-nitraniline-*o*-sulphonic acid and salicylic acid is treated with sodium sulphide, and the amino azo compound separated and treated with phosgene.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention: 228,900 (T. Goldschmidt Akt.-Ges.), relating to production of amorphous finely divided litharge, see Vol. XII, p. 382; 229,330 (Farbenfabriken vorm. F. Bayer and Co.), relating to manufacture of azo dyestuffs, see Vol. XII, p. 439; 230,082 (Chemische Fabrik Auf Actien, vorm. E. Schering), relating to manufacture of acridine compounds, see Vol. XII, p. 485; 231,150 (Farbenfabriken vorm. F. Bayer and Co.), relating to manufacture of pharmaceutical products, see Vol. XII, p. 537; 232,620 (Soc. of Chemical Industry in Basle), relating to manufacture of dyestuffs, see Vol. XIII, p. 18; 234,086 (Soc. of Chemical Industry in Basle), relating to condensation products of the anthraquinone series, see Vol. XIII, p. 108; 235,828 (M. Melamid), relating to obtaining liquids from brown coal or lignite, see Vol. XIII, p. 201; 237,872 (Soc. of Chemical Industry in Basle), relating to condensation products of the anthraquinone series, see Vol. XIII, p. 359.

### International Specifications not yet Accepted

244,070. Disubstituted Thioureas and Trithiocarbonates. Silesia Verein Chemischer Fabriken, Laasan, near Saarau, Germany. (Assignees of Flemming and Klein, Wissench. Chem. Laboratorium, Breslau, Germany.) International Conventiondate, December 6, 1924.

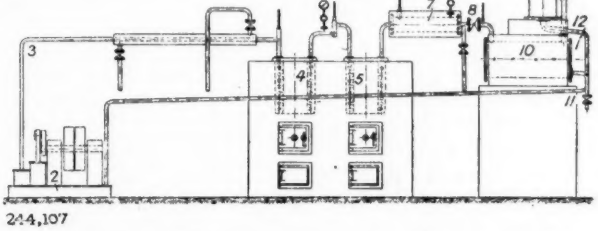
Equimolecular quantities of an aromatic amine, carbon disulphide, and aqueous alkali solution are caused to interact, whereby aromatic symmetrically disubstituted thiourea and trithiocarbonate are simultaneously formed. Thus, aniline may be shaken with caustic soda and carbon disulphide, yielding diphenylthiourea, which is filtered off and purified, and sodium trithiocarbonate.

244,078. Calcium Silicate, Cement, and Sulphur Dioxide. Rhenania Verein Chemischer Fabriken Akt.-Ges., 33, Kaiser Wilhelm Ring, Cologne, Germany. International Convention date, December 2, 1924.

Calcium sulphate is heated with silica or argillaceous shale by means of a fuel containing a large proportion of hydrogen such as oil or producer gas from lignite, to a temperature of 1,100° C. Sulphur dioxide and calcium silicate or cement are produced. The proportions of argillaceous shale and calcium sulphate may be so adjusted that a cement is obtained containing calcium oxide two parts, and silica, alumina, and iron oxide taken together one part.

244,107. Cracking Hydrocarbons. Deutsche Erdöl Akt.-Ges., 61, Martin Lutherstrasse, Schöneberg, Berlin. International Convention date, December 3, 1924.

Tar, bitumen, crude mineral oil, or distillation products or residues are forced by a pump 2 through a preheater 3, and heated coils 4, 5 in which cracking takes place. The products pass to a chamber 7 heated to maintain the cracking temperature, and through a pressure reducing valve 8 to a vapour separator 10. Unvaporised residue passes back to



244,107

the pump 2 and the vapours to a dephlegmator from which the reflux is also returned.

244,104. Detergents. Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. International Convention date, December 5, 1924.

These detergents consist of an aromatic sulphonic acid having more than 10 carbon atoms in the molecule and not hydrogenated in the nucleus, and higher aliphatic alcohols. In certain cases, one or more hydro-aromatic alcohols can be substituted wholly or partly for the higher aliphatic alcohols. Suitable alcohols are butyl, isobutyl, heptyl, octyl, and their

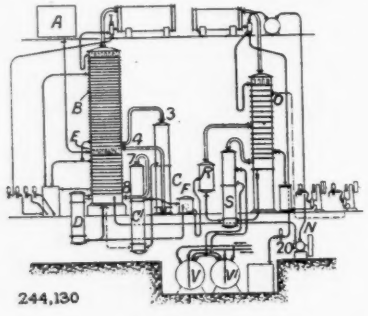
homologues. Thus, the sodium salt of isopropyl-betanaphthalene-sulphonic acid is dissolved in water and mixed with a mixture of alcohols boiling between 145° and 165° C., which is obtained by synthesis from carbon monoxide and hydrogen, and fractional distillation. In another case, the condensation compound from formaldehyde and cresol-sulphonic acid or naphthalene sulphonic acid is dissolved in water and mixed with cyclohexanol. These compounds are not decomposed by hard water or acids.

244,120. BENZANTHRONE DERIVATIVES. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, December 4, 1924.

These products are obtained by condensing crotonic aldehyde with anthracenes containing an oxygen atom in the meso position, such as anthrones, anthranols or oxyanthranols. Sulphuric acid with or without an ox dising substance such as arsenic acid, or mercuric oxide or sulphate, and a diluent such as acetic acid or chlorobenzene may be used as a condensing agent. The aldehyde may first be added to the anthranol in the presence of sulphuric acid, hydrochloric acid or a base such as piperidine, and the ring closure effected by heating with aluminium chloride. In an examp'e, anthranol and crotonic aldehyde are condensed at 115°–120° C. in sulphuric and glacial acetic acids containing arsenic acid. The Bz-methyl-benzanthrone formed is distilled with superheated steam and treated with a reducing agent. Several other examples are given.

244,130. DISTILLING CRUDE BENZOL. Soc. des Etablissements Barbet, 5, Rue de l'Echelle, Paris. International Convention date, December 5, 1924.

Crude benzol passes from a tank A through a heater E in a column B to a column C. Vapour passes through a pipe 3



244,130

to the column B and liquid to a heater $C^1$ heated sufficiently to evaporate the xylene. The vapour passes through a pipe 7 to the base of the column B, and the liquid through a separator F to an exhausted vessel R and column O. Vapour passes from the vessel R to the column and liquid to the heater S also connected to the column. The liquid passes to vessels V, $V^1$. Two rectifying columns are thus employed, the first of which separates benzol, toluol and xylol, and the second separates solvent naphtha and xanthene.

LATEST NOTIFICATIONS.

246,779. Process for obtaining nitrogeneous extracts and oil from albuminoid substances. Soc. Francaise des Produits Alimentaires Azotés. January 29, 1925.

246,803. Apparatus for distilling fatty acids. Bollmann, H. February 2, 1925.

246,809. Manufacture of new complex aurosodiumthiosulphate solutions. Cassella and Co. Ges., L. January 27, 1925.

246,817. Manufacture and production of alkylated aromatic sulphonic acids. I. G. Farbenindustrie Akt.-Ges. January 30, 1925.

246,827. Method of separating aluminium nitrate from potassium, sodium, iron, calcium, magnesium nitrates, present in mixed solutions of these salts. S. I. P. Soc. Italiana Potassa. January 28, 1925.

246,833. Production of phenol-aldehyde resins. Bakelite Ges. January 27, 1925.

246,834. Production of phenol-aldehyde resins. Bakelite Ges. January 27, 1925.

246,840. Manufacture of new alinines of the anthraquinone series and derivatives thereof. I. G. Farbenindustrie Akt.-Ges. January 31, 1925.

246,842. Process for the production of 2-amino-5-iodopyridine. Räth, Dr. C. February 2, 1925.

246,870. Manufacture of dry diazo-preparations. I. G. Farbenindustrie Akt.-Ges. January 30, 1925.

## Specifications Accepted with Date of Application

226,180. Hafnium and zirconium compounds, Process of separating a mixture of. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. December 12, 1923.

226,797. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. December 28, 1923.

227,440. Trisazo dyestuffs for dyeing cotton, Process for the manufacture of. Fabrique de Produits Chimiques, Ci-devant Sandoz. January 11, 1924.

234,109. Purifying, cooling, heating, mixing, or absorbing gases or vapours, Apparatus for. E. Theisen (Firm of). May 15, 1924.

236,145. Catalytic combustion of explosive gaseous mixtures, Process for. I. W. Cederberg. September 17, 1924.

238,174. Separation by liquefaction of complex gaseous mixtures. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. August 7, 1924.

239,527. Menthol, Method of preparing. G. Austerweil. August 21, 1923.

246,210. Benzol and similar hydrocarbons, Purification of. K. Cox and P. J. McDermott. October 21, 1924.

246,272. Dissolving and gelatinising cellulose esters, such as nitrocellulose and like cellulose compounds, Process for. V. Plinatus. December 4, 1924.

246,355. Recovering or separating caustic hydroxides from solutions containing them. J. Y. Johnson. (*Viscose Co.*) October 23, 1924.

246,361. Aqueous mineral suspensions, Process for causing deposition of. I. Traube. May 7, 1925.

246,377. Calcium nitrate fertiliser, Manufacture and production of. J. Y. Johnson, London. (*Badische Anilin and Soda Fabrik.*) June 22, 1925.

246,394. Dyestuffs, Manufacture of. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) August 7, 1925.

246,415–6. Hexamethylene tetramine from ammonium chloride, Production and separation of. H. Wade. (*S. Karpen and Bros.*) October 23, 1925.

## Applications for Patents

Ashcroft, E. A. Treatment of ores, etc. 3,249. February 4.

Ashcroft, E. A. Separation of manganese and/or iron salts from admixtures with melts of zinc chlorides, etc. 3,250. February 4.

Ashcroft, E. A. Metallurgy of lead-bearing compounds, alloys, etc. 3,251. February 4.

Ashcroft, E. A. Recovery of zinc and/or lead from blue powder, etc. 3,252. February 4.

Blackburn, H. W., and Thomas, W. Manufacture of ammonia 3,402. February 5. (June 9, 1925.)

Braunkohlen-Produkte Akt.-Ges., Bube, K., and Erlenbach, E. Treatment of distillation products from bituminous materials. 3,160. February 3.

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Manufacture of monoazo dyestuffs. 3,273. February 4. (June 29, 1925.)

Carpmael, W., and I. G. Farbenindustrie Akt.-Ges. Manufacture of compounds from 1-phenyl-2 : 3-dimethyl-4-dimethyl-amino-5-pyrazolone and halogenated alcohols or their esters with carbamic acid. 2,884. February 1.

Carpmael, W., and I. G. Farbenindustrie Akt-Ges. Manufacture of caustic alkali solutions. 3,149. February 3.

Carpmael, W., and I. G. Farbenindustrie Akt.-Ges. Manufacture of alkoxy amino quinolines. 3,274. February 4.

Carpmael, W., and I. G. Farbenindustrie Akt-Ges. Process for obtaining perfumes from flowers, etc. 3,275. February 4.

Gardner, D. Treatment of dyes, etc. 3,127. February 3.

Gewerkschaft Sachsen-Weimar. Process for fixing nitrogen. 3,362. February 5. (Germany, April 4, 1925.)

I. G. Farbenindustrie Akt.-Ges. Dyeing leather. 2,914. February 1. (Germany, February 3, 1925.)

I. G. Farbenindustrie Akt.-Ges. Production of fast-coloured resists under aniline black. 3,378. February 5. (Germany, February 5, 1925.)

I. G. Farbenindustrie Akt.-Ges. Method of working with carbon monoxide under pressure. 3,454. February 6. (Germany, February 7, 1925.)

I. G. Farbenindustrie Akt.-Ges. Production of phosphorous, phosphorous pentoxide, and phosphoric acid. 3,470. February 6. (Germany, February 6, 1925.)

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 3,281. February 4.

Räth, C. Production of 2-hydrazino-5-nitropyridine. 2,916. February 1. (Germany, February 5, 1925.)

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £37 per ton, Powder, £39 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. d/d; Contract, £8 10s. d/d, 4 ton lots.

BORAX, COMMERCIAL.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORATE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

SODIUM CHLORATE.—3d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¾d. to 5¼d. per lb. Crude 60's, 1s. 4d. to 1s. 6d.

ACID CRESYLIC 97/99.—1s. 8d. to 1s. 9d. per gall. Pale, 95%, 1s. 6d. to 1s. 8d. per gall. Dark, 1s. 3d. to 1s. 4d. per gall. Good demand.

ANTHRACENE.—A quality, 3d. to 4d. per unit; Paste 40%, 3d. per unit per cwt. Nominal price.

ANTHRACENE OIL, STRAINED.—7d. to 8½d. per gall. Unstrained, 6½d. to 7½d. per gall.

BENZOL.—Crude 65's, 1s. 2½d. to 1s. 3½d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 10d. to 2s. 2d. per gall., ex works in tank wagons.

TOLUOL.—90%, 1s. 9½d. to 2s. per gall. Pure, 1s. 11d. to 2s. 2d. per gall.

XYLOL COMMERCIAL.—1s. 11d. per gall. Pure, 2s. 2d. to 2s. 6d. per gall.

CREOSOTE.—Cresylic, 20/24%, 8½d. to 10d. per gall. Standard specification, 6½d. to 7d. per gall.; middle oil, heavy, 6½d. to 7⅛d. per gall.

NAPHTHA.—Crude, 9d. to 1s. per gall. Solvent 90/160, 1s. 5d. to 1s. 9d. per gall. 1s. 10d. paid in South. Steady demand. Solvent 90/190, 1s. to 1s. 2d per gall. 1s. 5d. in South.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £3 10s. to £5 15s. per ton. Whizzed or hot pressed, £5 10s. to £7 10s.

NAPHTHALENE.—Crystals and Flaked, £11 10s. to £13 per ton, according to districts.

PITCH.—Medium soft, 56s. to 61s. per ton, according to district. Market active.

PYRIDINE.—90/140, 17s. 9d. to 21s. per gall. Firmer. Heavy, 7s. to 10s. per gall.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—7s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—2s. 2d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7d. to 7½d. per lb. naked at works.

ANILINE SALTS.—7d. to 8d. per lb. naked at works.

BENZALDEHYDE.—2s. 1½d. per lb. Good home inquiry.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

*o*-CRESOL 29/31° C.—3d. to 3½d. per lb. Demand quiet.

*m*-CRESOL 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

*p*-CRESOL 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—1s. 11d. to 2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLANILINE.—2s. 10d. per lb. d/d.

*a*-NAPHTHOL.—2s. per lb. d/d. Fair home inquiry.

*B*-NAPHTHOL.—11d. to 1s. per lb. d/d. Fair home inquiry.

*a*-NAPHTHYLAMINE.—1s. 3d. per lb. d/d. Fair home inquiry.

*B*-NAPHTHYLAMINE.—3s. 9d. per lb. d/d. Fair home inquiry.

*o*-NITRANILINE.—5s. 9d. per lb.

*m*-NITRANILINE.—3s. 6d. per lb. d/d.

*p*-NITRANILINE.—1s. 9d. to 1s. 10d. per lb. d/d. Fair home inquiry.

NITROBENZENE.—5½d. per lb. naked at works. Good home inquiry.

NITRONAPHTHALENE.—10d. per lb. d/d.

R. SALT.—2s. 4d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 9d. per lb. 100% basis d/d.

*o*-TOLUIDINE.—9d. per lb. naked at works.

*p*-TOLUIDINE.—2s. 2d. per lb. naked at works.

*m*-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. Quiet market. Grey, £15 10s. per ton. Better inquiry. Liquor, 9d. per gall. 32° Tw.

ACETONE.—£81 per ton.

CHARCOAL.—£7 5s. to £9 per ton, according to grade and locality. Demand fair.

IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.

RED LIQUOR.—10d. per gall. 16° Tw.

WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 10d. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P. Very quiet.

WOOD TAR.—£3 to £4 10s. per ton, according to grade.

BROWN SUGAR OF LEAD.—£42 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£50 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5½d. to 6½d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£42 per ton ex wharf London in glass containers.
ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 7d. per lb. Keen competition met. Good demand.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.
ACID, BORIC B.P.—Crystal, £43 per ton; Powder, £47 per ton. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 3½d. to 1s. 4d. per lb., less 5%. Unsettled.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—5s. 3d. per lb. Resublimed, 7s.
ACID, SALICYLIC.—1s. 3d. to 1s. 6d. per lb. Technical.—10½d. to 11d. per lb.
ACID, TANNIC B.P.—2s. 10d. per lb.
ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.
AMIDOL.—6s. 6d. per lb., d/d.
ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—12s. 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—10s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—15s. 6d. to 17s. 6d. per lb.
BISMUTH CITRATE.—12s. 9d. to 14s. 9d. per lb.
BISMUTH SALICYLATE.—12s. 6d. to 14s. 6d. per lb.
BISMUTH SUBNITRATE.—13s. to 15s. per lb. according to quantity.
BORAX B.P.—Crystal, £27; Powder, £28 per ton. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 9d. to 1s. 11d. per lb.; sodium, 2s. to 2s. 2d. per lb.; ammonium, 2s. 3d. to 2s. 5d. per lb., all spot.
CALCIUM LACTATE.—1s. 4d. to 1s. 5d. Market firmer.
CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
FORMALDEHYDE.—£40 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—7s. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.
HYDROQUINONE.—4s. 4½d. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 1d. to 2s. 4d. per lb.
MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%, price reduced; Heavy Commercial, £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
MENTHOL.—A.B.R. recrystallised B.P., 26s. net per lb., Synthetic, 17s. 6d. to 22s. 6d. per lb., according to quality. English make.
MERCURIALS.—Red oxide, 5s. 5d. to 5s. 7d. per lb.; Corrosive sublimate, 3s. 9d. to 3s. 11d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 4s. to 4s. 2d. per lb.
METHYL SALICYLATE.—1s. 7d. per lb.
METHYL SULPHONAL.—16s. 6d. per lb.
METOL.—9s. per lb. British make.
PARAFORMALDEHYDE.—1s. 11d. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—4s. to 4s. 3d. per lb.
PHENAZONE.—6s. to 6s. 3d. per lb. Spot lower than forward price.
PHENOLPHTHALEIN.—4s. to 4s. 3d. per lb. Supply exceeds demand.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.
POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity. Steady market.
POTASSIUM METABISULPHITE.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 7½d. per lb., spot. slightly easier.
QUININE SULPHATE.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
RESORCIN.—3s. 9d. per lb. In fair quantities.
SACCHARIN.—51s. 5d. to 53s. 8d. per lb., according to quantity. Limited inquiry.
SALOL.—3s. per lb.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb. carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 80s. per cwt., according to quantity.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. per lb. Crystal, 1s. 11d. to 2s. 1d. per lb. Very heavy demand.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—11s. 6d. per lb. Limited demand.
TARTAR EMETIC, B.P.—Crystal or Powder, 1s. 8d. to 1s. 9d. per lb.
THYMOL.—12s. to 13s. 9d. per lb. Strong demand.

## Perfumery Chemicals

ACETOPHENONE.—9s. per lb.
AUBEPINE (EX ANETHOL).—9s. 6d. per lb.
AMYL ACETATE.—3s. per lb.
AMYL BUTYRATE.—6s. 6d. per lb.
AMYL SALICYLATE.—3s. 3d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 3d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 3d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 9d. per lb.
BENZYL BENZOATE.—2s. 9d. per lb.
CINNAMIC ALDEHYDE NATURAL.—18s. per lb.
COUMARIN.—11s. 9d. per lb.
CITRONELLOL.—15s. per lb.
CITRAL.—9s. per lb.
ETHYL CINNAMATE.—9s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—9s. 6d. per lb.
GERANIOL (PALMAROSA).—21s. per lb.
GERANIOL.—7s. to 16s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—14s. 6d. per lb.
LINALOL EX BOIS DE ROSE.—18s. per lb.
LINALYL ACETATE.—18s. per lb.
METHYL ANTHRANILATE.—9s. 3d. per lb.
METHYL BENZOATE.—5s. per lb.
MUSK KETONE.—30s. per lb.
MUSK XYLOL.—5s. 9d. per lb.
NEROLIN.—4s. per lb.
PHENYL ETHYL ACETATE.—12s. per lb.
PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.
RHODINOL.—32s. 6d. per lb.
SAFROL.—1s. 4d. per lb.
TERPINEOL.—1s. 8d. per lb.
VANILLIN.—21s. 6d. to 24s. per lb. Good demand.

## Essential Oils

ALMOND OIL.—12s. 6d. per lb.
ANISE OIL.—3s. 7d. per lb.
BERGAMOT OIL.—27s. per lb.
BOURBON GERANIUM OIL.—13s. per lb.
CAMPHOR OIL.—60s. per cwt.
CANANGA OIL, JAVA.—16s. per lb.
CINNAMON OIL, LEAF.—5d. per oz.
CASSIA OIL, 80/85%.—10s. per lb.
CITRONELLA OIL.—Java, 85/90%, 3s. 6d. Ceylon, 2s. 6d. per lb.
CLOVE OIL.—7s. 3d. per lb.
EUCALYPTUS OIL, 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—French 38/40%, Esters, 22s. 6d. per lb.
LEMON OIL.—12s. per lb.
LEMONGRASS OIL.—4s. 9d. per lb.
ORANGE OIL, SWEET.—11s. 9d. per lb.
OTTO OF ROSE OIL.—Bulgarian, 65s. per oz. Anatolian, 35s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—Wayne County, 130s. per lb. Japanese, 15s. per lb.
PETITGRAIN OIL.—9s. 3d. per lb.
SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

## Coal-Tar Dyes for Czechoslovakia

THE Czechoslovak textile industry imports, especially from Germany, large quantities of coal-tar dyes mixed with dextrine. Up to two years ago these dyes entered Czechoslovakia free of duty, but since then they have been subject to a duty of 500 crowns per 100 kilos. During this period a large number of protests and demands for the suppression of this duty have been made without result to the Ministry of Finance. According to Prague reports, representatives of the textile, starch, and dextrine industries met recently and demanded that tar dyes should be classed under "basic dyes," to exempt them from import duties.

## U.S. Copper Combine

To expand foreign sales and to raise prices, steps have been taken in New York to form a new export association of the principal copper companies. The development of foreign markets, the companies hope, will bring about an increase in copper prices to at least above 15 cents per lb., contrasting with the current level of between 14⅛ and 14⅜ cents per lb. The new organisation plans to stabilise the copper industry by mutual agreement.

# London Chemical Market

***The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.***

*London, February* 12, 1926.

THE volume of business passing has been decidedly better during the last week, in fact the turnover is more satisfactory than we have been able to report for some time. Prices on the whole tend upwards. Export trade is only moderately active.

## General Chemicals

ACETONE.—The price is very firm at £81 to £83 per ton ex store. Spot supplies are scarce.

ACID ACETIC has been in much better demand for home trade and the export business is also firmly active. Prices unchanged.

ACID FORMIC is unchanged. Demand is rather better—price, £50 to £51 per ton.

ACID LACTIC is in moderate demand at £43 to £43 10s. for 50% by weight.

ACID OXALIC makers have advanced the price by £1 per ton.

ACID TARTARIC is quiet and uninteresting at 11¼d. to 11½d. per lb.

ALUMINA SULPHATE is an active market, price being £5 15s. per ton for 17/18%.

AMMONIUM CHLORIDE remains a drug on the market. Price nominally £18 per ton.

ARSENIC market remains nominal owing to absence of demand. Price, £13 10s. to £14 per ton, which would be shaded for quantities.

BARIUM CHLORIDE is very scarce and is quoted £10 5s. to £10 10s. per ton.

BLEACHING POWDER is unchanged.

CREAM OF TARTAR is scarce for prompt delivery and commands £76 to £77 per ton.

EPSOM SALTS are very firm at £5 15s. per ton.

FORMALDEHYDE is quiet at £41 to £42 per ton.

LEAD ACETATE is a little weaker at £42 10s. per ton for white, but brown is maintained at £42 to £43 per ton.

LIME ACETATE is unchanged.

LITHOPONE is in fair demand at about £19 per ton ex store.

METHYL ALCOHOL is unchanged at £48 per ton, demand nominal.

METHYL ACETONE is a firm market at £59 per ton to £60 per ton.

POTASSIUM CARBONATE AND CAUSTIC are unchanged.

POTASSIUM CHLORATE is firm at 4¼d. to 4½d. per lb.

POTASSIUM PERMANGANATE is unchanged at 7½d. to 7¾d. per lb.

POTASSIUM PRUSSIATE is slow of sale, second hand supplies can be obtained at about 7¼d. per lb.

SODA ACETATE is again higher in price at £20 to £21 per ton.

SODA BICHROMATE is unchanged.

SODA CHLORATE is again advanced in price and is to-day 3⅛d. per lb.

SODA NITRITE is rather lower in price at £22 per ton ex store, Manchester.

SODA PHOSPHATE is unchanged.

SODA PRUSSIATE is quoted 4¼d. per lb.

SODA SULPHIDE is unchanged.

ZINC SULPHATE is unchanged.

## Coal Tar Products

The market generally maintains a firm tone, and there is little change to report from last week.

90% BENZOL is steady, at 1s. 9d. per gallon on rails, while motor benzol is quoted at 1s. 8¾d. per gallon.

PURE BENZOL is unchanged at 2s. 1d. to 2s. 2d. per gallon on rails.

CREOSOTE OIL is quoted at 6d. to 6¼d. per gallon on rails in the North, while the price in London is 7¼d. per gallon.

CRESYLIC ACID is firm, and is quoted at 2s. to 2s. 1d. per gallon on rails for the pale quality 97/99%, for export, while the dark quality 95/97%, also for export, is quoted at 1s. 11d. to 2s. per gallon on rails. For the home trade, the pale quality is quoted at 1s. 7d. per gallon on rails, and the dark quality at 1s. 6d. per gallon on rails.

SOLVENT NAPHTHA is firm, at 1s. 5d. to 1s. 6d. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES are unchanged, the lower grades being worth £4 to £4 10s. per ton, 76/78 quality about £6 per ton, and 74/76 quality about £5 10s. per ton.

PITCH.—The demand remains satisfactory and prices are well maintained. To-day's values are approximately 60s. to 62s. 6d. per ton f.o.b. main U.K. ports.

## Latest Oil Prices

LONDON.—LINSEED OIL quiet. Spot, £31 10s.; Feb. and March-April, £29 17s. 6d.; May-Aug., £30 2s. 6d.; Sept.-Dec., £30 7s. 6d. RAPE OIL inactive. Crude crushed, spot, £47; technical, refined, £50. COTTON OIL steady and unaltered. Refined common edible, £42; Egyptian crude, £35; deodorised, £44. TURPENTINE quiet and occasionally 3d. to 6d. per cwt. down. American, spot, 63s. 5d.; March-April, 65s. 9d.; and May-June, 64s. 6d.

HULL.—LINSEED OIL, spot, £30 17s. 6d.; Feb, £30 10s.; March-April to Sept.-Dec., £30 7s. 6d. COTTON OIL.—Bombay crude, £32; Egyptian crude, £33 15s.; edible refined, £37 5s.; deodorised, £36. PALM KERNEL OIL, crushed naked, 5 per cent., £41. GROUNDNUT OIL.—Crushed-extracted, £43; deodorised, £47. SOYA OIL.—Extracted and crushed, £38; deodorised, £41 10s. RAPE OIL.—Extracted and crushed, £46 per ton, net cash terms, ex mills. CASTOR OIL and COD OIL.—Unchanged.

## Nitrogen Products Market

*Export.*—The demand for sulphate of ammonia has been stimulated by the approach of the consuming season and the shortage of stock in the hands of merchants in several countries. As this livening was anticipated by producers the prices remain steady. British producers are still selling on the basis of £12 7s. 6d. per ton f.o.b. U.K. port in single bags. If the present demand continues, it appears likely that prices for March/April shipment will be raised. The demand is mostly coming from the Far East, but the Continent is now taking more interest.

*Home.*—The home demand is livelier than usual for early February. Orders are coming in from all parts of England, and the Irish demand necessitates frequent shipments from western ports. Home prices will not be changed under any circumstances. British producers have made arrangements to ensure a prompt supply of all consumers' requirements. Under these circumstances a heavy home season is anticipated.

*Nitrate of Soda.*—The nitrate market has been firmer on account of a large move out from dealers to consumers on the continent Cargoes c i.f. chief European ports have now changed hands at about £11 11s. per ton for prompt arrival. Higher prices are being quoted for March-April arrival.

## U.S. Lime Production in 1925

THE lime sold in the United States in 1925 amounted to 4,510,000 short tons, valued at $42,530,000, according to estimates furnished by lime manufacturers to the U.S. Bureau of Mines, Department of Commerce. These figures show an increase of 11 per cent. in quantity and 7 per cent. in value over the sales in 1924. The sales of hydrated lime, which are included in these figures, amounted to 1,505,000 tons, valued at $14,926,000, an increase of 14 per cent. in quantity and 13 per cent. in value. The average unit value of all lime showed a decrease from $9.72 a ton in 1924 to $9.43 in 1925, and that of hydrated lime a decrease from $10.03 a ton in 1924 to $9.92 in 1925. Sales of building lime were about 2,365,000 tons, an increase of 9 per cent. The estimated sales of chemical lime for 1925 were 1,885,000 tons, an increase of 14 per cent. The dead-burned dolomite reported as sold for refractory is estimated at 375,000 tons compared with 328,659 tons in 1924. The demand for lime for use in agriculture was somewhat better in 1925 than in 1924, and the sales are estimated at 260,000 tons, an increase of 5 per cent.

Lime sold by the producers in the United States gave the following figures:—1924, hydrated lime (short tons), 1,316,664; total lime (short tons), 4,072,000. Value, $39,596,423. In 1925 comparative figures were 1,505,000, 4,510,000 short tons; $42,530,000.

## Chemical Progress in Greece

THE latest official report on the industrial and economic situation in Greece states that the chemical, dyestuffs, and soap making industries have made considerable increases in their output during recent years. Such articles as "Saxoline"—the Greek equivalent to aspirin—have a large sale and are of excellent quality. Chemical manures, soap, and aniline dyes have an annual production of about 25,000, 23,000 and 90 tons respectively, while the value of the sheet and bottle glass produced ranges round about 28 million drachmas. Paint also shows a considerable increased production. The production of alcohol, manufactured exclusively from currants and helped by the large surplus crop of the latter, is on the increase, and now amounts to some 9,000 tons of pure alcohol, of which 5,800 tons are used in the manufacture of spirituous liquors, 450 tons for mixture with wine and 2,750 tons for industrial spirit. A new distillery has recently been completed at Volo.

# Scottish Chemical Market

***The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.***

*Glasgow, February* 12, 1926.

BUSINESS in the heavy chemical market remains fairly steady although buyers are apparently reluctant to buy very far, ahead.

Prices on the whole remain unchanged, one exception being sodium acetate, which is very scarce for both spot and early delivery.

### Industrial Chemicals

ACID ACETIC, 98/100%.—Quoted £55 to £67 per ton according to quantity and packing, c.i.f. U.K. port. 80% pure, £40 to £41 per ton; 80 % technical, £38 to £39 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated, or small flaked, £37 per ton. Powdered, £39 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Remains in good demand and quoted, price rather higher at 5¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at about 1s. 3⅜d. per lb., less 5%, ex wharf in moderate demand.

ACID FORMIC, 85%.—Continental offers remain steady at about £49 15s. per ton, ex wharf, prompt shipment. Spot material quoted £51 per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—Remains unchanged at £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Rather higher quotations from the Continent. Now quoted 3⅝d. per lb., ex wharf. Prompt shipment. Spot material still available at about 3⅜d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Usual steady demand, but price rather easier. Quoted 11½d. per lb., less 5% ex wharf, but could probably be obtained at a fraction less.

ALUMINA SULPHATE, 17/18% IRON FREE.—On offer from the continent at about £5 10s. per ton, c.i.f. U.K. ports. Spot material available at £6 5s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £7 15s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material available at about £9 2s. 6d. per ton, ex store. Powdered quality on offer from the continent at about £7 10s. per ton, c.i.f. U.K. ports.

AMMONIA, ANHYDROUS.—Now quoted 1s. 3½d. per lb., ex station, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5-cwt. casks, delivered or f.o.b. U.K. ports. Industrial quality about £10 per ton less.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £26 to £27 per ton, ex station. On offer from the continent at about £22 10s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £18 15s. per ton, c.i.f. U.K. ports, prompt shipment from the continent.

ARSENIC.—In little demand. Spot material now quoted £17 per ton, ex store. Offered for prompt shipment from works at £16 10s. per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £9 10s. per ton, ex store, spot delivery. On offer from the continent at about £8 5s. per ton, c.i.f. U.K. ports. Fine white crystals about 5s. per ton less.

BLEACHING POWDER.—English material quoted £9 10s. per ton, ex station. Contracts 20s. per ton less. On offer from the continent at about £7 15s. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £22 10s. per ton; crystals, £23 per ton; powdered, £24 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental available at about £3 17s. 6d. per ton, ex wharf.

COPPERAS, GREEN.—In moderate demand for export. Now quoted £3 17s. 6d. per ton, f.o.b. U.K. ports.

COPPER SULPHATE, 99/100%.—Good demand for export and price of English material unchanged at about £24 per ton, f.o.b. U.K. ports. Continental on offer at about £22 per ton, ex wharf.

FORMALDEHYDE, 40%.—Quoted £38 per ton, c.i.f. U.K. ports. Spot material available at about £39 5s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at about £3 per ton, c.i.f. U.K. ports.

LEAD, RED.—Spot parcel of imported material on offer at about £41 10s. per ton, ex store. Quoted £40 15s. per ton, c.i.f. U.K. ports, to come forward.

LEAD, WHITE.—Quoted £41 5s., ex store, spot delivery.

LEAD ACETATE.—Spot material on offer at about £44 10s. per ton, ex store. On offer from the Continent at £43 per ton, c.i.f. U.K. ports. Brown quality about £38 5s. per ton, c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH, CAUSTIC 88/92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports, according to quantity and destination. Spot material available at about £29 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quality quoted £25 10s. per ton, ex wharf, early delivery. Spot material available at about £26 10s. per ton, ex store. 90/92% quality quoted £22 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE 99/100%.—A quantity of crystals available at £31 10s. per ton, c.i.f. U.K. ports. Powdered quality on offer at about £30 per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—Quoted £22 15s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material available at about £25 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7½d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Offered for prompt shipment, ex Continent, at about 7¼d. per lb., c.i.f. U.K. ports. Spot material available at about 7½d. per lb., ex store.

SODA CAUSTIC.—76/77%, £17 10s. per ton; 70/72%, £16 2s. 6d. per ton; broken, 60%, £16 12s. 6d. per ton; powdered 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Very scarce for spot delivery, quoted £22 per ton, c.i.f. U.K. ports. Prompt shipment from the Continent.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 per ton ex station. Minimum 4-ton lots. Pea crystals, £14 5s. per ton, ex station. Continental commercial quality offered £9 per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98% Refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the Continent about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Spot material on offer at 4½d. per lb., ex store. Offered from the Continent for prompt shipment at about the same figure.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, ex works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—60/65%, solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton; crystals, 31/34%, £8 12s. 6d. per ton. All delivered buyer's works, U.K., minimum 5-ton lots, with slight reduction for contracts. 60/62% solid quality offered from the Continent at about £10 10s. per ton, c.i.f. U.K. ports. Broken, £1 per ton more; crystals, 30/32%, £7 10s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £11 per ton; Roll, £9 15s. per ton; Rock, £9 15s. per ton; Ground, £9 10s. per ton—ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—British material 95/98% quoted about £24 per ton, f.o.b. U.K. ports; 98/100% solid on offer from the Continent at about £22 10s. per ton, c.i.f. U.K. ports. Powdered, about 20s. per ton extra.

ZINC SULPHATE.—Continental manufacture on offer at about £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

### Coal Tar Intermediates and Wood Distillation Products

DIMETHYLANILINE.—1s. 11d. to 2s. per lb. Fair home inquiries.

GAMMA ACID.—7s. per lb. Small home inquiries.

PARANITRANILINE.—1s. 10d. per lb. Some home inquiries.

ANILINE OIL.—7d. per lb. Fair home inquiries.

BETA NAPHTHOL.—11d. to 1s. per lb. Some home inquiries.

# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, February 12, 1926.*

Buyers of chemicals for the home section of the trade are taking supplies in fair quantities, but, as before, deliveries are mainly for prompt or near dates, though inquiry on forward account is being received. Late rates are being adhered to in most instances, and the price position is steady in pretty well every department. On overseas account actual demand continues rather slow, but traders report feelers from some of the Dominion markets and also from the East.

### Heavy Chemicals

Sulphide of sodium still fails to attract much buying interest and rates are easy, though no lower, 60-65 concentrated solid standing at round £11 per ton and the commercial quality at about £9 15s. The demand for soda crystals is maintained at its recent level, with values ranging round £5 5s. per ton. Alkali is firm at £6 15s. per ton and is selling in fair quantities. Phosphate of soda is a rather dull market at round £12 5s. per ton. Inquiry for saltcake and glauber salts is slow in both instances, with quotations still in the neighbourhood of £3 and £3 5s. per ton, respectively. Prussiate of soda is steady and in quiet request at 4¼d. per lb. Caustic soda values are quite firm at from £15 2s. 6d. per ton for 60 per cent. up to £17 10s. for 76-77 per cent., and a fair volume of trade is passing. Acetate of soda, though not too active, is steady at about £19 per ton. Bicarbonate of soda has a slow sale, but rates are without change on the basis of £10 10s. per ton. Hyposulphite of soda is likewise in limited demand with values on the easy side, commercial being about £9 15s. per ton and photographic crystals at round £14. The position of chlorate of soda remains quite firm at 3⅛d. to 3¼d. per lb. Business in bichromate of soda is on a small scale, and rates have an easy tendency, round 3¼d. per lb. being asked. Bleaching powder is steady and in fair request at about £8 10s. per ton.

Carbonate of potash meets with a quietly steady demand and prices are certainly no easier, 96-98 per cent. strength offering at about £26 per ton. Caustic potash is moderately active at £27 10s. per ton for 90 per cent. material. Yellow prussiate of potash continues steady at 7¼d. per lb., though actual trade is not very extensive. Permanganate is quiet, but not much changed at 7¼d. to 7½d. per lb. for pharmaceutical, about 5½d. being asked for commercial. Bichromate of potash is not arousing very much buying interest though still quoted at round 4½d. per lb. Chlorate of potash is fully maintained at 4d. per lb.

Little or no improvement has occurred in respect of arsenic, but values are unaltered, white powdered, Cornish makes, still being quoted on the basis of £14 per ton at the mines. Sulphate of copper keeps quiet but fairly steady at £24 to £24 10s. per ton. A moderate inquiry for Epsom salts is reported at £3 10s. to £3 15s. per ton; magnesium sulphate, B.P. quality, is about unchanged at round £4 10s. per ton. Nitrate of lead meets with a quiet demand at £40 to £41 per ton. Acetate values are steady. White acetate of lead is still on offer at round £44 and brown at £39 to £40 per ton. Grey acetate of lime is fetching £17 10s. to £18 per ton and the brown material about £8.

### Acids and Tar Products

Acid prices are steadier than they have been. Oxalic acid is having a fair sale at 3¾d. per lb. Commercial acetic acid is in moderate request at £36 to £37 per ton for 80 per cent.; glacial is unchanged at £67 to £68. Tartaric acid is in quiet demand at about 11½d. per lb., while 1s. 3½d. about represents the value of citric acid.

Pitch is still a firm section of the coal-tar products market at about 57s. 6d. per ton. Crystal carbolic acid is about maintained at 5⅛d. per lb. and crude at 1s. 5d. per gallon. Creosote oil is steady and in fair demand at 6¾d. per gallon. Crude naphthalene is fairly steady at from £4 5s. per ton, with refined quiet at £13 10s. Solvent naphtha is on offer at 1s. 5½d. to 1s. 5¾d. per gallon.

# Alleged Infringement of Chemical Patent

### Judgment Reserved

When the hearing was resumed on Friday, February 5, of the action by the Commercial Solvents Corporation, Ltd., against the Synthetic Products Co., Ltd., before Mr. Justice Romer in the Chancery Division (see The Chemical Age, January 16, 23, 30, and February 6), Mr. Edward Halford Strange, one of the principals of the defendant company, was cross-examined.

The action was for an injunction restraining the defendants from infringing the plaintiffs' patent for Dr. Weizmann's process for the manufacture of acetone and butyl alcohol by the fermentation of the starch of maize or other grain through the operation of a bacillus which Dr. Weizmann claims to have isolated, known as "βγ."

Professor Fernbach, in evidence, said that in his opinion what he patented by the specification of 1912 was a fermentation process that was unknown up to that time. The object was to obtain, through the fermentation of carbohydrates, aectone and the higher alcohols simultaneously. There was a time when he thought that, as the result of his work leading up to the application for the patent, the yield from his process would be 50 per cent– that was with the help of additional nitrogen, but he afterwards reduced his estimate. The strain that gave the best yield at that time was the first "F.B." If infection could be got rid of he had no doubt at that time that the fermentation of maize was a commercial proposition. The reason he worked on potatoes instead was that, when starting a new process, it was useless to try different materials. The best thing was to stick to one substance and go through with that. He had read the paper wh ch Mr. Amos Gill gave before the Society of Chemical Industry, describing the process as practised at the King's Lynn factory after the Government took it over in 1916, and he agreed with everything the paper contained. There was nothing in common between the conditions of yeast fermentation and the process carried on at King's Lynn. The process carried on there before the war, when the factory was in the hands of Strange and Graham, and that described by Mr. Gill were the same in his opinion.

Cross-examined on Monday he said he could not tell if he had seen "βγ," and he had certainly made no tests with it. It was possible, by giving "F.B." a good training, to obtain a large commercial yield from maize starch.

Sir Duncan Kerly: And that was your secret!

Professor Fernbach: I don't think it is a secret because it can be found in published literature. He had never published his own process, but that was not because he had no inclination to. It was because he had intended to lecture about it before the Society of Chemical Industry during the war, and the lecture was stopped by the Government. During the war the process was a secret.

### French Government and Successful Demonstration

Proceeding, he said he remembered the French Government asking him to demonstrate his process at Melle in September, 1916, and it was a success. He made his demonstration after one had been made of the Weizmann process. The French Government worked his (witness's) process successfully with sub-cultures of the strain known as "160." No stimulant was used nei her was it hydrolised.

Mr. Amos Gill, who had charge of the fermentation process at the King's Lynn factory from 1916 to 1918, quoted from his lecture, and said the process was carried on under anaerobic conditions. The manner in which the defendants worked their process at Rainham now was exactly similar to that worked at King's Lynn while he was there from 1916 to 1918.

In support of the defendants' claim that Dr. Weizmann's process was insufficiently described in his specification, evidence was given by Dr. J. M. Goldsmith, consulting chemist, of 67, Chancery Lane; Mr. John Lewis Yuill, bacteriologist, and Mr. Julian Baker, bio-chemist.

Mr. Whitehead, K.C., on Tuesday, summed up the evidence for the defence. He submitted that there had been no infringement, and that there was invalidity. Under the latter head the plaintiffs' specification, he said, claimed no limitation to a specified natural substance, but covered the fermentation of any such substance that was rich in starch;

and there was no limitation to a fermentation process in which no nutrient was added. Also he said there was well-established evidence of prior user.

Mr. Whitehead made an important statement on Thursday when dealing with the allegation that Dr. Weizmann obtained his inventions from the defendants.

**Sharp Comment by the Judge**

His Lordship remarked that it appeared to him that some of the defendants' witnesses had looked for opportunities to damage Dr. Weizmann's character for honesty. He said he could not see the slightest evidence that Dr. Weizmann had done a single thing that an honest man ought not to do.

Mr. Whitehead said he had to make a statement on that point. He h d put no questions to Dr. Weizmann suggesting that he had knowingly included in the claims in his specification something which he obtained from the defendants. He wanted to say in the clearest possible way that he made no suggestion that Dr. Weizmann had knowingly included anything of the kind in his claims.

His Lordship: I am very glad to hear it.

Sir Duncan Kerly, K.C., replying for the plaintiffs, said the charge made against Dr. Weizmann was disgraceful and reckless. It was disgraceful to the people who made it and was such as to impute that they could not be relied on as witnesses. The charge was put forward in 1915 to Lord Moulton and was not withdrawn until the last moment.

Judgment was reserved.

# Company News

SNIA VISCOSA.—The distribution of a dividend of 25 lire per share, being equal to 12½ per cent., has been approved.

CROSSLEY BROS.—A dividend of 3½ per cent. is proposed on the cumulative preference shares for the half-year ended December 31 last, making 7 per cent. for the year.

NEW TAMARUGAL NITRATE CO., LTD.—The local board has decided to r commend to the shareholders at the annual general meeting, to be held on February 17, a final dividend of 25 per cent., less income tax, making a total of 35 per cent. for year.

NITRATE RAILWAYS CO., LTD.—At special meetings of shareholders on Wednesday, in connection with the proposed increase of the company's capital by an issue of bonus shares, an amended resolution allotting 75 per cent. of their existing holdings to the holders of ordinary shares, 25 per cent. to the holders of the preferred converted ordinary shares, and 50 per cent. to the holders of the deferred converted ordinary shares was passed unanimously.

DOMINION TAR AND CHEMICAL CO., LTD.—The directors announce that owing to relief having been granted in respect of the payment of Dominion income-tax for the five years ended December 31, 1924, the following amounts should be added to each £1 of the free-of-tax dividends on the ordinary shares in order to arrive at the adjusted gross amounts of such dividends in computing the total income of the holders for income-tax or super-tax.

In respect of the dividends paid on July 1, 1920, to March 18, 1921, 6s. 0¾d.; July 4, 1921, to March 9, 1922, 5s. 1¾d.; July 15, 1922, to March 9, 1923, 3s. 10¾d.; July 10, 1923, to March 28, 1924, 2s. 11¼d.; September 12, 1924, and March 30, 1925, 2s. 10½d.

BORAX CONSOLIDATED, LTD.—The report for the year ended September 30 last states that the profits for the period, after providing for all management and administration expenses, are £425,112. The requirements for the debentures interest for the year, the interim dividends on the preference shares and on the preferred ordinary shares paid May 1, 1925, amounted to £139,640, leaving, with the amount brought forward, a sum to be dealt with of £451,204. To buildings, plant, etc., depreciation reserve account, there has been placed the sum of £30,000, and to the credit of the debenture stock redemption sinking fund the annual premium of £5,825, leaving to the credit of profit and loss account the sum of £415,379.

Th directors propose to pay a final dividend of 1s. 6d. per share on the deferred ordinary shares, making 12½ per cent. for the year, placing to general reserve £25,000, to income-tax reserve accrued to September 30, 1925, £5,000, to pensions and grants fund £5,000, and carrying forward to the next account £196,629.

## Chemical Trade Inquiries

*The following tenders are invited by municipal, etc., authorities, the dates in parentheses representing the last day for receiving tenders.*

CREOSOTE OIL, PITCH.—Barrowford District Council. The Clerk (February 20).

TAR, OILS, ETC.—Tar (refined coal), oils, Portland cement: Chester-le-Street, Clerk, Union Offices (February 19).

TAR.—Chichester: Tar, tar and bitumen mixture, and bitumen (155,000 galls.): Surveyor of Highways (February 27). Battersea Borough Council, Town Clerk (March 1). Tar, pitch and creosote oils: Southend-on-Sea, Town Clerk (February 26). Distilled tar: Twickenham Urban District Council, Town Clerk (February 24).

SLUDGE PRESS FILTER CLOTH.—Leeds Corporation. For supply for 12 months at Knostrap sewage works. Town Clerk (February 17).

WHITE CEMENT.—Chilean importing agents desire to represent British manufacturers. (Reference No. 165.)

## Gas Light and Coke Co.

**The Government's Electricity Guarantee**

AT the two hundred and nineteenth ordinary general meeting of the proprietors of the Gas Light and Coke Co., on February 5, at the chief office of the company, Horseferry Road, Westminster, Mr. D. Milne Watson (the governor of the company), said that the past year had been one of considerable anxiety. Early in the year it became apparent that it would be impossible to maintain the price of gas at the figure they had been charging since June, 1923, as they were met with a most serious slump in the market for residuals, more especially in respect of their principal residual, coke. The price of coke fell away, especially in the export market, and they had no alternative but to raise the price of gas per therm from 8·6d. to 9·4d. as from June last. This increase in price brought about a reduction in the dividend for the second half of the year from £5 6s. 8d. to £4 17s. 4d. He was glad to say, however, that notwithstanding the increase in the price of gas, they had had an increase in business of nearly 4 per cent.

There had been a net increase of capital expenditure of about half a million, bringing the debit balance on the capital account to £855,000, as against £348,000 as at the end of 1924.

**Slump in Residuals**

On the credit side of the revenue account there was an increase of £600,000 in the receipts for gas. In the case of the residual products there was a decrease in coke of £500,000 and in breeze of £30,000. Tar products were down by £115,000 and sulphate of ammonia £38,000, a total falling off of £700,000. It was this slump that necessitated the increase in the price of gas in June. One question above all others was in the minds of shareholders present, and that was the Government's proposals regarding electricity. At the beginning of last year the present Government announced that they had appointed a special committee, of which Lord Weir was chairman, to consider proposals with regard to the reorganisation of the electrical industry in this country, and in due course it was announced that this committee had come to certain conclusions. These conclusions were not made public, but from what was said it became quite apparent that the recommendations of the Weir Committee were of a very drastic character.

He wished to make it clear that the gas industry had no hostility to electricity *per se* and realised that electricity rendered great and important services to the community—in fact, their feelings were quite friendly.

The Prime Minister had assured them, and such assurance was satisfactory, that there would be no direct subsidy to the electricity industry; on the other hand, however, he had definitely stated that State guarantees would be granted similar to those granted under the Trade Facilities Acts, a matter which might be of serious import to the gas industry. In this connection he thought that the Government should, in all fairness, be prepared to give equal financial assistance to gas.

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ST. JOHN, F., 6, Great Sutton Street, E.C., druggists' sundriesman. (C.C., 13/2/26.) £14 7s. 1d. January 11.

STAR POLISH CO., LTD., Cambridge Works, Cambridge Road, Hanwell, manufacturers. (C.C., 13/2/26.) £19 8s. December 16, and £17 3s. 1d., January 6.

## Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CLOVER PAINT AND COMPOSITION CO., LTD., Liverpool (M., 13/2/26.) Registered January 30, £20,000 debenture to bank, charged on 12 and 14, Grayson Street, and 37, Chaloner Street, Liverpool; also general charge. *£30,000. July 28, 1925.

DRUG AND CHEMICAL CORPORATION, LTD., London, E.C. (M., 13/2/26.) Registered January 26, £1,850 mortgage, to E. H. Montauban, 60, Avenue Road, Regent's Park., and others; charged on Daccol Works, 41, Lower Kennington Lane, S.E. *£1,750. December 31, 1924.

### Satisfactions

CLOVER PAINT AND COMPOSITION CO., LTD., Liverpool. (M.S., 13/2/26.) Satisfaction registered January 30, £20,000, balance of amount registered May 5th, 1924.

DRUG AND CHEMICAL CORPORATION, LTD., London, E.C. (M.S., 13/2/26.) Satisfaction registered January 26, £3,000, registered October 31, 1919.

LEVER BROTHERS, LTD., Port Sunlight, soap manufacturers. (M.S., 13/2/26.) Satisfaction registered February 1, £24,500, part of amount registered April 13, 1921.

## London Gazette, &c.

### Companies Winding Up Voluntarily

COAL BANK BLEACHING AND DYEING CO., LTD. (C.W.U.V., 13/2/26.) O. Stocks, Irwell Terrace, Bacup, Chartered Accountant, appointed liquidator February 1. Meeting of creditors at the Grosvenor Hotel, Manchester, on Thursday, February 18th, at 3.15 p.m.

PALATINE CHEMICAL CO., LTD. (C.W.U.V., 13/2/26.) J. P. Duxbury, 27, Richmond Terrace, Blackburn, incorporated accountant, appointed liquidator February 2. Meeting of creditors at the office of the liquidator, February 15th, at 3 p.m.

SOCLEANO, LTD. (C.W.U.V., 13/2/26.) S. W. Dixon, 25, Shaftesbury Avenue, London, W.1, appointed liquidator January 30th.

### Notice of Dividend

MANGOLD, Louis Augustus, and MANGOLD, Charles Bernard, trading as MANGOLD BROS., at 17, Harp Lane, London, E.C., chemical merchants. First and final dividend, 2d. per £, payable February 15, Poppleton, Appleby and Hawkins, 4, Charterhouse Square, London, E.C.1.

## Business Names Registered

*The following (trading name and address, nature of business, date of commencement, and proprietors' names and addresses) have been registered under the Registration of Business Names Act.*

COLEBY AND CO., 165, St. Leonard's Road, Poplar, E.14, wholesale chemists and druggists. January 1, 1926. Wm. A. Harrison, 113, Becontree Avenue, Chadwell Heath, Essex.

## New Companies Registered

CARBON RESEARCH SYNDICATE, LTD.—Registered February 9, 1926. Manufacturers of and dealers in chemicals and chemical substances, activated carbon and any form of carbon and carbonaceous materials, fuel and material capable of being converted into fuel, building materials, etc. Nominal capital, £500 in £1 shares.

HUMPHREYS, PERCIVAL ELLIS (1926), LTD. Registered February 5, 1926. Manufacturers and merchants of tanning materials and extracts, dyes, colours, chemical substances, etc. Nominal capital, £30,000 in £1 shares. Solicitors: Slaughter and May, 18 Austin Friars, London, E.C.2.

INTERNATIONAL PULP AND CHEMICAL CO., LTD., Bush House, Aldwych, London, W.C. Registered February 8, 1926. Miners, millers, lumbermen and manufacturers of timber, lumber, pulp and paper, etc.; chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £1,000,000 in £1 shares (600,000 8 per cent. cumulative preference and 400,000 ordinary shares).

### Chemical Tenders Accepted

AMONG orders received for January the Grinding and Pulverising Department of International Combustion, Ltd., London, reports: One latest type 8 ft. by 36 in. Hardinge conical ball mill for grinding 10 tons an hour of lead zinc ore from 1½ in. to 48 mesh. One 7 ft. by 22 in. Hardinge conical ball mill for grinding five tons an hour of hard lead zinc ore to 48 mesh. Both these orders come from Spain. One 8 ft. diameter by 60 in. length of cylinder Hardinge conical ball mill for the wet grinding of raw material for cement—for France. One 8 ft. diameter by 60 in. length of cylinder Hardinge conical ball mill for dry grinding of clinker. One 3 ft. diameter by 8 in. cylinder Hardinge ball mill for grinding zinc residues—for North of England. One 3 ft. Hum-mer screen for screening litharge. One 8 ft. Hum-mer screen for screening rubber.

Other recent chemical tenders accepted include: Plant for Dawsholm Chemical Works, for Glasgow Corporation, steel staging in sulphate of ammonia house, P. and R. Fleming and Co., £83; steam-driven centrifugal, Watson, Laidlaw and Co., £394. Fuel oil (100 tons), for Gillingham Town Council, British Petroleum Co., 17s. 6d. per ton. New oxide of iron for Smethwick Town Council, Manchester Oxide Co., Ltd., 37s. per ton (recommended); Steam heater and separator, Worthington-Simpson, Ltd., £165 (recommended). Tar, 28,000 galls. for road spraying, for Thornbury District Council. Butler's, Ltd., Bristol, 6¼d. per gallon.

### Egyptian Salt and Soda Changes

IN THE CHEMICAL AGE of January 30 considerable disputes at a meeting of the shareholders of the Egyptian Salt and Soda Co., Ltd., were reported. Now advices from Alexandria state that at the extraordinary general meeting held there on January 25 an exhaustive report of the directors covering the events which have led up to the resignation of the Board was read, together with a formal letter of resignation from the directors. On a vote being taken by a show of hands as to whether new directors proposed by the supporters of the fusion scheme should be elected or the old board re-elected, the supporters of the former carried the day. The old board then left their seats and the proceedings came to an end. The poll arranged by the late chairman to enable all shareholders to record their vote on the fusion proposals which have met with so much criticism was to take place as previously arranged on February 8, but no details are at present available.